

# DRAGON<sup>®</sup> USER



*The independent Dragon magazine*

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June 1983

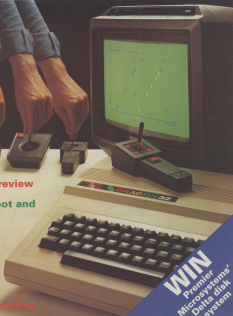
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## Salamander Software



# DRAGON USER



June 1983

**Editor**  
GRAHAM CLIVINGHAM  
(01-639 3448)

**Software Editor**  
GRAHAM TAYLOR (01-639 2904)

**Editorial Secretary**  
CAROLINE OWEN (01-639 3466)

**Advertisement Manager**  
DAVID LAKE

**Advertisement Executive**  
SARAH LANGSTON (01-639 3443)

**Administration**  
THERESA LACY (01-639 3266)

**Managing Editor**  
DUNCAN SCOT

**Publishing Director**  
JENNY IRELAND

Dragon User, Holthouse Court, 19 Whitcomb Street, London WC2 7AP.  
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## How to submit articles

The quality of the material we can publish in Dragon User each month will, to a very great extent, depend on the quality of the ideas/complexities that you can make with your Dragon. The Dragon 32 computer suite launched on us in the market with a powerful version of Basic, but with very poor documentation.

Every one of us who uses a Dragon will be able to discover new tricks and quips almost every day. To help other Dragon users keep up with the speed of the development team at us, we must assume that we made the discovery first — that means writing it down and passing it on to others.

Articles which are submitted to Dragon User for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, wherever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

We pay for articles according to the length and the quality — it is worth making that extra bit of effort.

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# Editorial

LESS THAN HALF WAY into the year and the predictions of the home computer industry and Chinese astrologers alike are already being revealed as accurate — the year of the Dragon is truly upon us. Not only is the Dragon 32 attacking new markets, in this case the US, but new machines are being lined up to attack different markets in the UK. And are offering users increased performance have already arrived.

But these additions are beginning to change the nature of the beast in question. Joystick jockeys and Basic beginners may be wondering where Dragon Data is going and whether they will be left behind — not exactly alone, for there are more than 80,000 Dragon 32 users, but maybe a little isolated. The answer from the company is an emphatic no — and the same goes for this magazine.

However, Dragon Data's moves into new markets certainly present fresh challenges. It may be a cliché to warn that the US scene is highly competitive, but nonetheless it is a necessary observation. Alan, Texas Instruments, Commodore and Tandy (with its similar Colour Computer) will not yield easily to any UK invader. The business market in this country will be equally unbending. In fact it can be argued that the year of the Dragon may turn out to be a make or break one for the company.

Dragon Data has already commented that the costs of the export drive have been worked out in fine detail, down to the third decimal place. When you're talking about US sales in the region of 200,000 those decimal points soon become very whole numbers.

But the selling prices of home computers can be very flexible. Smiths cut the prices on Sinclair machines at the end of last April. There are no prices for guessing what the boards at Melcor announced not long after — you've guessed, price cuts. Similarly, price reductions in the US last Christmas saw retailers manufacturers playing their own particular game of tit for tat. Obviously such activities can play havoc with those decimal point calculations.

In the UK, business market no one machine or manufacturer has established a strong position. The number of rivals may appear threatening, but a machine as soundly developed as the Dragon 32 is for its market would threaten in its turn.

The cost of developing new micro for these markets and then promoting them is high — but not as high as the rewards. The first half of this year, for all its activity, may look more like a lull by the time 1983 has come to an end.



# COMPUSENSE

## Software for Dragon 32



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## HI-RES

upgrade is £11 by 24 display

cartridge C24.28

Just plug this cartridge into your DRAGON, switch on and you have a 24 column by 24 line display with true business characters. This amazing software uses the high resolution mode to draw the characters on the screen and allows you to use BASIC almost as normal. In fact there are a number of extensions to BASIC to allow you to use the many additional features:

- Mix graphics and text on the same screen
- Select any of nine standard ASCII character sets for FRENCH, SPANISH, GERMAN, ITALIAN, DUTCH, USA, SWEDISH, DANISH or JAPANESE.
- Redefine any of the 384 characters.
- SPRINT GRAPHICS MODE enables any character to be as big as 8 x 100 dots.
- A fast responsive keyboard with AUTO-REPEAT.
- Extra shift gives the missing characters on the DRAGON keyboard.
- Learn about 18,000 bytes for BASIC.
- Switch between HI-RES and normal modes at any time.
- BLACK on GREEN, BLACK on WHITE, GREEN on BLACK or WHITE on BLACK.
- 32 by 16 compatibility mode for existing programs.

HI-RES is a must for serious programming.

## DASM

an easy-to-use 6809 machine code assembler cartridge £16.95

- Specially designed for convenient use on the DRAGON.
- Does not use a separate editor.
- Ideal for producing machine code routines to be called from BASIC.
- Includes a 6809 Reference Card.

Type your assembler program just as you would a BASIC program and use BASIC to call DASM. When DASM has assembled your program it returns to BASIC where you can check for errors and exclude the program immediately if required. The source program is saved and coded using the normal SAVE/LOAD. The assembled program may be saved to tape using SAVE/M (this can easily be done automatically in BASIC when the assembly has finished).

DASM is a two-pass symbolic assembler which allows labels of any length (the first five characters and the last character are used). All the 6809 mnemonics and addressing modes are supported plus comprehensive assembler directives for defining constants, reserving memory, directing output to screen or printer. Errors detected by DASM are reported with easy-to-understand text messages.

## DEMON

Machine Code MONITOR

cartridge £16.95

DEMON gives you access to the inside of your computer. It features a real time display of memory locations in both hexadecimal and alphanumeric modes, a full screen editor for memory and register contents and multiple breakpoints. There are numeric commands designed to assist in debugging and running machine code programs for BASIC programs with PEEK and POKE.

DEMON, unlike other products, has its own documented input and output routines which means that it does not interfere with BASIC. DEMON can be called from a BASIC program and will return control to the BASIC program. A user manual and a 6809 Reference Card are included.

## DASM/DEMON

cartridge C30.45

Combines DEMON and DASM in one cartridge. The ideal combination for developing machine code programs on the DRAGON.

## DECODE

BASIC Converter

cartridge £16.95

DECODE converts BASIC programs between TAMEX COLOR format and DRAGON 32 format. Simply LOAD the "decoder" program from tape, EXEC the cartridge and the program is converted. The same cartridge will work on a DRAGON 32 and a TAMEX COLOR (Extended BASIC).

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The MC6809 Cookbook (Warren)	£9.95

Postage on books: add 50p per book — maximum charge £1.00

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## Copyright routine

WHILE PLAYING around with my Dragon 32 I came up with the following useful routine which is ideal to put a copyright on all programs written by us amateurs.

Type:  
10 REM  
20 REM

New type:  
EXEC (35512)

Then press ENTER twice. Software is produced on the screen. LIST your program.

New type directly:  
"YOUR MESSAGE" = 35512 (in the case COPYRIGHT SHELDOH SOFTWARE = 35512)

Then type:  
EXEC COPYRIGHT SHELDOH SOFTWARE (or YOUR MESSAGE) and type ENTER twice.

You will now see that the message on this case COPYRIGHT SHELDOH SOFTWARE is now at line 65535. This line cannot be edited or deleted and is hence a safe place to store your messages. You can now delete lines 10 and 20 and then type in your program.

W. Delaport,  
Compton,  
Worcestershire.

## Selected listing

LAST MONTH I said I have been less than happy with the way the Dragon lists programs.

But I wonder if I had realized that it is possible to list a selected portion. LIST 300-400 does and so does LIST -400 stops at 400.

One tip is to put just before a key routine is a program end or two lines:

REM \*\*\*\*\*

This can easily be spotted even when a list is running through fast, in time to press BREAK and stop it.

One thing I find was adding a short end-program to longer programs.

3000 STOP  
3010 INPUT X  
3020 GOTO 3010

This should have given me a quick way of listing a segment, and by entering 30100000 and

then the number of the section of the program I wished to list.

But for reasons I cannot fathom this just produces a syntax error. Does anyone know why, and if there is a way around the problem.

Anthony Bower,  
London W9D

## Try the manual

I AM writing in reply to the letter from Ashley Bass on the subject of the Dragon's listing facility.

To find a program listing all that is necessary is to enter (LIST) and to continue simply press any key. Did Mr Bass not read the (user's) manual?

Finally, a word of warning. Poking location 65465 with one may seriously damage your processor's health.

Glyn Faith,  
Surrey,  
Aldershot.

## Twice unlucky?

AFTER THREE months use my Dragon 32 suddenly dumped as four's typing and other ignored commands, or gave 5M (PRGR) to everything. I have to complain as it was immediately replaced by the dealer.

However, the other evening I loaded a program only to find chunks of it missing. Error messages were themselves erasable and the Dragon started printing every second lines of graphic characters across the screen. I switched off, reloaded and had no further trouble.

I remember having similar problems with one of the early calculators that was simply caused by dust getting in the

works. I could seal erasable pots if this is the problem, or would you think that I have been unlucky a second time?

By the way, how many other Dragon owners have noticed that Doug Olson's Poole and Poole routine (PCW 17-33 Feb) can be used to double-load a program thereby making use for the lack of a VERIFY command?

D L George,  
Sturminster Newton,  
West Sussex.

## Bridging the gap

THERE MUST be, by now, many users who have mastered the simple programming techniques and now want to know how the machine carries out the tasks we set.

It seems to me that there is a vast gap, for example, between those people, like myself, who know what PEEK and POKE are and do, and those who know what values to poke and where to poke them.

There seems to be no 'in-between-stage' info published.

I would like readers to consider the following program which, although simple enough in concept, raises many questions to be unraveled.

```
10 FOR I = 32768 TO 48192
20 AC = CHR$(PEEK(I))
30 PRINT I; "....."; AC
40 FOR J = 1 TO 255: NEXT J
50 NEXT I
60 END
```

For examination of the additional information booklet and its memory map this program prints out the section of the memory that contains the Basic interpreter, and it is very interesting to see the entire range of commands. However, why is the last letter

of each word represented by a low-resolution graphics character?

Also, I notice three commands not mentioned in any literature that I have read, namely LIST, DLOAD and TAB, with CHR\$(165). As this character only appears this once I have no way of telling which letter it represents.

What are the uses of these commands I assume that whatever the CHR\$(165) represents, the TAB function will be the normal one? And why are they not listed in the instruction book?

I hope my point is clear that understanding Basic is not the same thing as understanding computers.

David Hunt,  
Moulton,  
Northants

## Test the leads

IN REPLY to P A Lewis's cry for help over the non-representing of programs from his Dragon perhaps the fault lies with neither the micro nor the cassette recorder but with the leads that connect them.

On opening up the jack plug on the Dragon leads he may well find the wires have not been crimped onto the plugs. This has caused strain on the soldering which has broken.

Ray C Cole,  
Merry Hill,  
Worcestershire

## Dipswitch changes

I HAVE owned a Dragon 32 since last September and have found it a useful micro.

Recently I bought a Seikosha SP100A printer. After I had installed the two together I found that the LIST command (barely mentioned in the Dragon manual) did not work at all time overwrote the previous one. To overcome this the code had to be removed and dipswitch 3 had to be moved to the 0th position.

Switches 1 and 2 can be altered if you require a 9 pin. I hope this information may be useful to anybody who cannot get his Seikosha printer working.

Andrew Prosser,  
Hydon,  
County

## Software Top 10

- |    |                          |       |             |
|----|--------------------------|-------|-------------|
| 1  | Dentary King             | ..... | Microdeal   |
| 2  | Katapult Attack          | ..... | Microdeal   |
| 3  | Planet Invaders          | ..... | Microdeal   |
| 4  | Space War                | ..... | Microdeal   |
| 5  | Dragon Trek              | ..... | Salamanca   |
| 6  | Alcatraz II              | ..... | Microdeal   |
| 7  | Quertl                   | ..... | Dragon Data |
| 8  | Wizard War               | ..... | Salamanca   |
| 9  | Chess                    | ..... | Dragon Data |
| 10 | Madness and the Minotaur | ..... | Dragon Data |

Chart compiled by Boeth



# Dragon Dungeon

## NUMBER ONE FOR THE DRAGON DRAGON OWNERS CLUB

The Dungeon is also the home of the largest Dragon Owners Club in the UK for, since members are scattered through Europe to Africa and the Middle East, should we say 'the world'!

The club magazine, *Dragon's Teeth*, is published monthly and includes news, reviews, advice and information exchange for dedicated Dragon-bashers. Free members' adverts, monthly offers (some members have already saved the cost of their subscription), competitions and, for extrovert Dragonards, badges and bomber jackets.

### DRAGONWARE CATALOGUE

The *Dungeon* stocks the widest range of Dragon 32 software in the UK.

Send for our 20-page Dragonware Catalogue (20p, refundable on first order — free to Club members).

**Latest games:** *Dragon King* £8.95, *Galapagos* £5.95, *Talking Android Attack* £8.00, *Master Defender* (Tiger Software) £8.95, *Strategic Command* £9.95, *Into the Labyrinth* £7.95, *Ring of Delirium* £10.95, *Galactic Assault* £8.00, *Monster Mine* £7.95, *The Valley* £71.45, *Pirate* £5.50, *Star Jumper* £7.95, *Bomb* £7.95, *Night Flight* (night simulator) £7.95, *Pepper's Game Pack* £7.95.

**Latest books:** *Dragon Extravaganza* £5.95, *Making the Most of Your Dragon* £3.95, *Advanced BASIC for the Dragon* £5.95, 5800 assembler for the Dragon £5.95, *Dynamic Databases for the Dragon 32* £4.95, *The Power of the Dragon* £4.95, *Know your Dragon* £5.95.

**Latest utilities:** *Hilflos Machine Code Cartridges* (41 x 24 screen, 10 characters add, delete, insert, stop) £25.00, *Dragon POWER and RUNNER* £19.95, *Teppender* £14.95, *Dragon Daemons and Demons* £3.00, *Brainpower* (Seamus's Encyclopedia) £5.95.

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## Try your chances as an author

If you think you've designed a winning piece of software and you want to try to market it yourself, a company based in Hampshire may be able to help you.

Direct Media Facilities (DMF) has set up a copying

service for authors and will design entry cards for the cassette. The company can also give some advice on marketing.

Mark Andrews, DMF's production control manager, said: "We'll deal with anyone who gives us a call."

To try and avoid any legal problems DMF is asking users of the service to sign a statement accepting responsibility for the copies produced.

DMF is based in Waterlooville in Hampshire — on (07014) 68037.

## Games arrive at the Midland Fair

THE MIDLAND Computer Fair, held in Birmingham's Bingley Hall, saw an improving situation for Dragon users.

The fair, which was held over three days from April 28, had impressive displays from both Salamander and Microdot — the two market leaders in independent Dragon software.

And other software houses, traditionally associated with different machines, have turned their attention to the Dragon — with both Quintavina and

Personal Software Services offering new games.

Salamander had two new programs at the exhibition — *Starquest*, an arcade-style space-chase game, and an extended graphics system.

Salamander also announced that it will be selling its products in Boots — the retail chain — and in an interesting turnaround said that it will soon begin producing software for the Tandy Colour Computer. An initial order of Salamander software has already gone out to Boots.

## Dragon Data goes on offensive

DRAGON DATA's expansion plans are going ahead, with four new machines being lined-up to extend the company's range.

Dragon 38 owners can upgrade to 64K in the second half of May by changing boards at a cost of £75.

The 64K board will give users 48K of Ram, the rest going to Microsoft's Basic. However, Dragon Data will also be offering some languages on cassettes, Fort and possibly Logo, giving users the full 64K to play with.

For users wanting more memory the disk drive system, available at the same time, will give 200K (unformatted) in an

entry level system costing £275.

The 64K board will also be used inside the Dragon 64 which will cost £250-£300 and have other extras such as RS232C interfaces.

The next machine in line will still be 6809-based, but with a more sophisticated performance — monitor interfaces, improved graphics, plug-in expansion, etc. This is due in September, costing under £400, followed by a business model next year.

By then the wheel will have turned more than full circle and Dragon Data is already considering a new machine to replace the 32.

## Strike the right note

It is now possible to get better quality and more versatile sound from your Dragon using a Sound Enhancement Module from JCB Microsystems.

You can experiment with harmonies and produce three-

note chords with one Music command.

The module also gives games players a range of pre-programmed sound effects. These include machine guns, falling bombs and the more gentle sound of birds.

The £24.95 module plugs into the cartridge port and has no extra wires or leads. JCB Microsystems is on (02052) 423873.

## Telesoftware lined up for summer

INTERFACES LINKING Dragons to a service known as Micronet 800 will be ready late this summer, giving users telephone access to a range of free and discounted programs.

Micronet 800 also offers electronic mail and message handling facilities, computer news, and access to the more than 250,000 pages of information stored on the Prestel videodata system.

The leads, hardware and software needed to link Dragons to Micronet 800 will be ready this September. They will be supplied as a networking interface package costing about £10.

Other costs will cover subscription to Micronet 800 at £32 a year, and to Prestel at



Micronet 800 — Dragon interfaces are scheduled for late September

a cost of about £20 a year.

There is an additional charge for connections to the central computer between 8 am and 6 pm on weekdays, and up to 1 pm on Saturdays. Obviously you also have to pay for the telephone time you

spent connected to the service.

In return, Dragon users will get access to free games and educational programs which they can download over the telephone. The service's organizers say that more than 100

such listings are available, constantly updated.

In addition you will be able to send messages to other Micronet 800 or Prestel users — straight from your keyboard. And messages for you will be held on an electronic mailbox.

These messages can only be accessed with your personal subscriber number which you receive with your interface package.

Micronet 800 was launched last March and aims to pick up 100,000 subscribers in its first three years of operation. Interfaces were available for BBC models first, others have followed.

The service is a joint project of British Telecom, Telespac, ECC Publications and Prism Microproducts.



## Disk market gets in gear

USERS WAITING for Dragon disk drive systems are going to have a wide range to choose from by the end of the summer.

In addition to Dragon Data's own models, drives will be available from Microprocessor Engineering (MEL) of Southampton and from the Spectrum dealer chain.

Craydon-based Premier Microsystems already has two systems available, with more to follow.

MEL's entry-level system consists of one drive, a power supply unit, controller and interface — for about £275. The disk is the smallest of the microfloppies on the market, the 5 inch MEO-1 developed in Hungary.

But MEL's Stephen Peic pointed out that the chip in the disk controller is capable of handling up to four disk drives of any size — 5, 5½ or 8 inches. MEL therefore plans to



The MEO-1 single-sided floppy disk in plastic packaging

add other packages to the range, called Jet-Disk.

Neither MEL nor Premier is worried about Dragon Data's disks. As Peic says: "It independents wanted to see what manufacturers did and I never do anything."

And Peter Rixson added: "The market is more than large enough for all of us."

Premier's first two systems, Delta 1 and 2, come with a

controller cartridge, cable and 5¼ inch Canon disk drive.

The entry-level systems, with a 40-kb/c, single-sided disk offering 100K of storage, costs £299.95. Delta 2 doubles the storage.

Spectrum, on the other hand, is waiting to see what Dragon Data does before introducing its Windows systems. The first will be a high model costing about £275.

## Modem on its way from Cotswold

A THREE-MAN team at the Cotswolds is opening a wider world of communications to Dragon users by introducing two standard interfaces for the machine as well as a modem.

From June, Cotswold Computers will be selling RS232 interfaces linking Dragons to a range of peripherals such as disk drives and printers. This will cost about £30.

A modem, also available this summer, will allow Dragons to talk to each other over the phone, so that small communications networks can be set up.

By the end of the year, the firm will also be selling an IEEE interface, extending the range of options for users even further.

Cotswold Computers can be reached on (04548) 737472.

## AT LAST! EFFECTIVE PROGRAMMING AIDS TO HELP YOU GET THE MOST FROM YOUR MICROCOMPUTER



### PROGRAM DESIGN PAGE (108 Sheets A3 — 116" x 160")

The use of this system will enable development of a structured approach to programming, a concept recommended by the BBC and other Educational Bodies.

The sheets allow careful planning and storage of each program being designed and are cross referenced with each other when longer, more complicated programs are developed. They can be used as an immediate debugging guide when checking any newly coded program, and will prove an invaluable tool for any micro-programmer, whatever make of computer is being utilized.

### GRAPHIC PLANNING PAGE (108 Sheets A3 — 116" x 160")

The large size sheet allows the incorporation of an enlarged high resolution grid, with the usual coordinates numbered on all four sides, to allow easier visual planning when programming graphics. Structured reference sections are clearly defined to enable all relevant information to be obtained on the same sheet, making it simple to refer to if problems are encountered when running the program. Packs are available for Spectrum, Dragon 32 and BBC.

**GRAPHIC PLANNING GRID (180 Sheets A4 — 82" x 116")** Each grid is designed for use with specified micro-computers, and is a non-scaled aid to programmers wishing to develop their skills in designing high resolution graphic displays. Grids are marked on all four sides with usual reference numbers, appropriate to each computer for which they are available (Spectrum, Dragon 32 and BBC). An ideal aid for beginner and expert alike.

## LOGIC-PLAN

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NAME

ADDRESS





## News Desk

01-639 2446



John Symes: "It won't cause us too many headaches."

## Changes forced on Donkey King

MICRODEAL HAS withdrawn its highly successful game for the Dragon 32 — Donkey King.

This move follows a statement from Computer Games that it considered the name an infringement of its copyright on the title Donkey Kong.

Microdeal has agreed to alter the game which has been

extensively advertised in the computer press. Microdeal, managing director John Symes, said: "If they have trade marked it, then fair enough, we are happy to comply."

"Actually it won't cause us too many headaches, we were going to replace it anyway. Now we will call it The King."

## Champions comes up a winner

SOFTWARE HOUSE Peaksoft adapted its Champions football package to predict the winner of an important non-league game — and both the fans and the local team emerged triumphant.

The adapted version was run on a Dragon and predicted that the local team, Gorton Athletic, would win 3-2.

Athletic did win by one goal,

but the final score was 2-1. The package was also nearly right about the time of the winning goal which came in the 94th minute — just two minutes later than predicted. Two of Athletic's three scorers were also correctly forecast.

Champions sells for £9.95 for the Dragon and Peaksoft can be contacted on (02063) 44804.

## One club opens as another shuts

ONE DRAGON club has opened as another closes its doors to new members — Dragon Data has finally put its club into operation while the Dragon's Den starts to shut.

Users, who have been sending off their Dragon guarantee cards since last August, should by now have received the first issue of Dragon Data's Stop Press.

This promises that "details of how to apply for membership of the Dragon Users' Club will appear in the next edition of the newsletter".

Subscription for the first year will be free, commencing from the date of release of Stop Press rather than the date of returning the warranty card.

The Dragon's Den, a far smaller club based in Luton, no longer wishes to attract new members. The group's organisers promise that he will honour existing agreements but does not want more people to join.

He puts this down to "competition from other user groups and commercially-backed Dragon clubs".



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## Dungeon opens its cellar doors

The biggest Dragon users' club so far has its centre at Ashbourne — we went to talk to the Dungeon Master.

INTRODUCING THE DUNGEON MASTER and featuring a cast of 2,400, we bring you the Dragon Club at the Dungeon. Or rather Peter Woods, the Dungeon Master in question, brings you the club — for he is the organiser of the largest Dragon users' club so far, with 30 new members joining every day.

Membership of the club costs £5.00 a year, or £3.25 for a six-month trial. Overseas rates are slightly higher (£8.00 and £4.50), but this has not stopped members joining from outside the UK — from Scandinavia, Germany, France, Spain and as far afield as the Arabian Gulf and Zambia. As Peter says: "The Dragon has spread its tasty wings."

UK members range from the outer Orkneys in Scotland down to Jersey in the English Channel.

### From fishing . . .

Peter is a former high-flying marketing man who has come to rest at Ashbourne in Derbyshire. When he decided to end his corporate career he moved into the fishing tackle business with two partners. He had already come into contact with computers when his marketing work took him to

California's Silicon Valley. Computerising his new business's accounts increased his interest.

Peter explained that one of the problems with selling fishing tackle is that demand is seasonal, with a lull at the beginning of each year. Moving into the home computer business — with high post-Christmas sales of software and add-ons — seemed an ideal way of filling the lull and continuing business with pleasure.

The quality of the Dragon, and of the financial backing Dragon Data used to go independent last year, made Peter's mind up — hence the Dragon Dungeon, the trading branch of the business. But Peter is more than a businessman, he is an enthusiast — hence the Dragon Club. Now he devotes nearly all of his time to the Dragon while his partners look after the fishing tackle trade.

The Dragon Dungeon's business revolves around the Dragon — it sells a wide range of software and add-ons. The latest catalogue from the firm describes more than 80 games packages, in addition to educational and business programs, and more than 10 utilities, including Automaster's Dragon Utilities and Demos. Com-

puteriser's Decode cartridge and Dragon Port from Cass.

Peter emphasises that the Dragon Club is not a marketing outlet for the Dragon Dungeon. Members of the club receive a monthly newsletter called Dragon's Teeth. In this Peter promises: "We'll try to keep the reviews and articles free from commercial bias. The Dungeon may indeed stock the program, but if you think it's lousy, then say so. If you don't agree with the reviewer, then write in and say so."

Peter wants members to take over the club and the magazine, with the Dungeon acting as a co-ordinating centre. Dragon Dungeon is moving into new premises and Peter plans to leave one room free for shadow members suggest the club should be doing. As he says: "We want to hear from you." Slightly enough, the club room will be in the cellars of the new building.

### . . . to feedback

Peter is already getting feedback from members as Dragon's Teeth shows. The stage of members' programming tips, questions and answers is sold if not surprising. The favour of the club is conveyed more by a tongue-in-cheek plea from one lonely heart, a request for help for a handicapped Dragon user, and a free advertisement for a smaller user group looking for members.

A lot of Peter's satisfaction comes from detecting and fostering this spirit of camaraderie. But he does warn that the Dragon market is becoming big enough to attract fly-by-night businessmen — so beware.

And he also has some words of advice against copying programs. "Most of the chaps who write that software you've just ripped off a tape for wasted long hours over the keyboard. Their return is normally a royalty on the number of tapes sold. If we want to have a steady supply of new, ever-improving software we've got to look after the writers."

But mostly the Dungeon is not a greedy place. Members are already taking over the magazine, contributing reviews as well as tips, and qualifying for a range of special offers, club badges and club T-shirts. If you're feeling particularly adventurous, you can even order a laminated packet to let the world know that you are a Dragon owner.

Peter admits that he does expect his business to profit from the activities and reputation of the club. But in any rivalry between his business ambitions and his enthusiasm for the club, neither is the loser — instead it is his sleep that suffers. Your Dungeon Master often gets less than five hours of rest a night. Maybe the dim light in the dungeon is some kind of substitute for sleep.

Peter can be contacted at the Dragon Dungeon, PO Box 4, Ashbourne, Derbyshire DE8 1AQ — or telephone (0335) 44626.



Peter Woods — whose Dungeon Club spreads from Scandinavia to Zambia





# Alien go home

*John Scriven tests his hand-eye co-ordination on some arcade-type action games — and finds some winners.*



THIS BATCH OF recent software for the Dragon shows considerable variation, both in content and in quality. Many new software houses are advertising each month, and with such variety it is sometimes difficult to see the wood for the trees. Games can often be divided into two camps: 'skill' games that involve fast hand-eye co-ordination, and 'brain' games that involve careful, logical thought — although better games certainly involve both types of ability. This month I shall be looking at the first category which includes mainly arcade-type action games.

Alien Blitz from Gam Software, at £7.99, is a version of City Bomber. The game involves bombing a city of sky-scrapers until you have enough room to land your craft. All the while, your fuel stocks are being depleted. When I loaded this program, I felt rather dubious about such a dated idea — it is not, after all, a difficult game to write, and listings have been published in magazines for some time now. This version is competent enough, and employs good graphics and sound, it also gives you the chance to climb higher or lower (in most versions you are forced to sink lower each time you cross the screen). It is a reasonable game to play the first few times, but soon becomes boring. Although you may get some fun out of this cassette, it is rather overpriced for the type of game it is.

There are two versions of Missile Commander on offer: Missile Defender from Tiger Software and Defense from Microdeal.

Before the days of 'pretty picture' arcade games like Donkey Kong, my favourite way of wasting 10p was an Missile Commander. The arcade version pits you in charge of three bazookas protecting cities dotted across the bottom of the screen. As the game starts, alien missiles fall from the top of the screen towards the cities. As they get lower, they split into baby rockets which are just as deadly.

Your defence missiles are directed by moving a cross on the display; instead of joysticks, the arcade version uses the rather neat idea of controlling movement by a large ball that spins under your fingers. As each scorefull of missiles is successfully destroyed, another faster, more unpleasant enemy descends, containing smart bombs that home in on your cities with alarming accuracy.

## Smooth ride

How well do these two Dragon versions approach the graphics and speed of the original? Missile Defender is a little on the slow side, and the graphics are rather 'chunky'. If I had not seen Defense, I would have said Missile Defender was fair value for money at £5.75; however, if you can afford £8.00, then the Microdeal version is considerably more professional. The graphics are more detailed, and as the program is written in machine code, the joysticks feel smoother and more responsive. As with many of its programs, Microdeal has obtained the license to sell an American game originally written for the

Tandy Color Computer. The title frame of the game shows that it comes from 'Colorful Software', and is well worth the extra £2.25.

These two cassettes also demonstrate an important point about program information. Missile Defender contains nothing on the cassette sleeve apart from the title and the name of the supplier. Defense contains a brief description of the game, but more importantly tells you that joysticks are required. If you regularly buy games software for your Dragon, then it might be assumed that you have a pair of joysticks, but it must be frustrating to arrive home with a new tape, only to discover that you have to spend the best part of £20 before you can play it. If only all software houses would supply the basic information.

Master Run and Breakout are an opposite sides of pre-cassette — Arcade Action from Apex Trading. The games are very basic, and some children who played them compared them to old 2048 listings — not, I feel, intended as a compliment! The cassette is, of course, only £3.95, which is not an awful lot; however, for a little more, you could buy a really exciting tape.

Space Mission from Gamma starts off in an exciting manner. After the introduction, a space vehicle appears on the launch pad, and there is a very nice piece of graphics as it lifts off and goes into orbit. This is when the game itself starts, and you realise, as cosmic rocks come tumbling towards you, that it is just another version of Asteroids. You can rotate your



ship to the left or right and fire at them. After they are destroyed, a wave of alien craft attacks you. This sequence is repeated until you are too badly damaged to continue. At this point, you return to the earth in a similar manner to the launch and you are given a grading according to how well you have performed.

The first few times I played this game, I was impressed by the introductory and briefing sections, but as they are not really part of the game, they become irritating and it would be nice to jump straight into the action. The active part of the game is of a reasonable standard, but it is not difficult to discover strategies to ensure a good score, and I feel that arcade experts would find it lacking in real challenge.

## Packaging

Although you certainly can't tell a book from its cover, in the realm of computer software it is usually true that nicely presented cassettes containing good documentation show the same amount of thought when it comes to the program itself. For me, a good tape should contain instructions in the packaging as well as in the program. The latter should be optional viewing each time, to prevent boredom, but there's nothing worse than trying to absorb complicated instructions from the screen, only to discover that you've forgotten something vital at the beginning and have to run the program again.

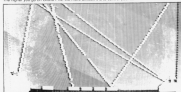
Salamander Software usually manages to produce interesting games and its cassettes are always neatly packaged in mini video covers containing a game description as well as detailed instructions. Grand Prix is no exception to this, and the documentation also reminds you of the very fairly well-known PCW 65495.0 to speed-up Basic programs.

The game starts with the opportunity to choose one of eight motor racing circuits from around the world including Indianapolis and Brands Hatch and you can select the number of laps you wish to race. Either one or two players are allowed, and movement is controlled by the use of joysticks. The fire button combines the functions of brake and accelerator. When you are ready to begin, the selected track appears, with the cars shown as coloured dots. At easy levels of difficulty there are few problems, but the higher you go, the more difficult it is to stop your car from colliding with other vehicles or from spinning off after passing over patches of oil. When this happens (rather too frequently in my case!), the screen flashes and in most cases, the race is over for you. I found this game entertaining, and although not my favourite, it should appeal to any budding champions with £7.95 in their pockets.

Monster Mine, another game from Gam Software, demonstrates the improvement in speed that is achieved in a machine code program. The object is to get a little figure from the bottom level of a mine to the surface while collecting as much gold as possible. This task is made more difficult (I almost said impossible, but I am



The higher you go on Grand Prix, the more difficult it is to control your car



Clunky graphics in Salamander from Tiger Software

assured) it can be done by monsters who take along each level.

Some of you may like the facility to enter your name in arcade games, but be warned in Monster Mine, some unkind personal messages are flashed on the screen as you fail for the umpteenth time! The stats at the next level are positioned at random along the passages, making this a challenging game, that needs careful planning before you make your dash for freedom from the safety of the bottom level. You are allowed the luxury of a pause button, but it can be used only once a game. This is an original variation on maze chase programs and is one of the best from Gam, well worth the £7.95.

With all the versions of Invaders and Space Wars on the market, it is a pleasure playing a game that shows a spark of originality, even if it has limitations. Such a game is St George and the Dragon from Computer Rentals. Although it may appear to be an adventure game, it actually involves steering the hapless saint across the screen, with either joysticks or control keys. Both were rather difficult, especially as there are little things like slippery bridges and fire-breathing dragons to impede your progress. I soon discovered the impossibility of swimming in a heavy suit of armour, and it was some time before I came close to rescuing the damsel in distress.

To keep you amused, there are musical interludes as you sink beneath the water or impersonate a piece of burnt toast. Instead

of a fail rating, at the end you get to see how far up the Saints' league you reached. Although it is not the smoothest game ever written for the Dragon, it is worth the £5.95 to fall about in helpless laughter watching some other idiot make a worse mess of it than yourself (perhaps that's not a saintly thing to say).

## Exceptions

Although it is often the case that combinations of games combine short programs that the writers don't have the nerve to sell individually, there are exceptions. One of these is Gamstape 1 from B & H Software, containing four games, Lunar Lander, Jackpot, Blackjack and Horse Racing.

Jackpot is a fruit machine program that uses large graphics to show the spinning wheels. I don't really see the point of programs like this, as it's hardly competitive, and involves no skill to play. The only advantage is that although you can't win anything, you also can't lose real money when you play. This game is the weak point on the cassettes, and Blackjack is only marginally better, although the graphics are well-conceived. While not wishing to encourage readers to blow their pocket money or housekeeping allowance on the real thing, these gambling games do seem to have their limitations, and I always have a sinking suspicion that the computer cheats!

I have left the other two programs on the cassette to last as they really are the b





St George and the Dragon - Just to seem to be heavy set of armor

charities in the pudding. Horse Racing resembles other versions in that players select horses from a field of runners, which then race across the screen to the finishing post. There are similarly ends. In this game you are presented with a race-card giving full information on the previous performance of each horse, weight, starting price, etc. All in all, a much closer simulation to the real thing. There are options that allow you to put money on to win, to have an each way bet, or to make a forecast. Starting with a limited amount of capital, the object is to make your first million in four days' racing. Not content with a full game like this, the actual race uses excellent graphics — no chunky blocks that look like Boccie dogs!

#### A real test

The last game, Lunar Lander, is the best version I have seen for the Dragon, and although the compensation price is rather high at £119.99, it would be almost worth it for the fine simulation alone. At the start, you are shown a general view of the surface of the moon. You have to successfully land three stages on small bases at a

subtly slow rate of descent. As you approach the surface, the screen display changes to a detailed view and the landing platforms are clearly marked. Controls are available for left and right movement as well as negative thrust from the retro-rockets.

If the game finished here, it would be exciting, but having completed your training mission, the real test is yet to come. The task is now to steer the craft through a tortuous maze to pick up people from the surface, without either crashing or running out of fuel. This is a challenging and well-written game, and well worth considering.

There are two versions of 3-D maze games in this selection. Sultan's Maze is supplied by Gem Software, and Phantom Slayer by Microdeal. Sultan's Maze gives the opportunity of being an excellent game when it is first played. It is perhaps unfortunate that viewing Phantom Slayer immediately after lands is detracted from the initial opinion. Again, it is a case of a machine code version showing up the deficiencies in Basic.

In spite of this, Sultan's Maze is still

worth considering. The scene is set in Hampton Court maze, where the Sultan's bodyguard attempts to locate his robbed master. The maze is viewed from above at the start, which helps with your orientation, if nothing else, as you attempt to negotiate the maze while viewing it in 3-D from the inside. If you are prepared to sacrifice large amounts of energy, you can look at the maze again at even closer through the hedges. There are several jewels lying on the paths, and as well as picking these up, you have to avoid running into the guard who appears in (good, or nasty, graphics as he keeps out of you).

Phantom Slayer from Microdeal is a similar game, involving a maze and unpleasant guardians. The maze instantiates this time are phantoms who spring out at you. These are difficult to destroy and even though you are equipped with lasers, the best bet is to shoot, turn and run for cover behind a hedge when you see a phantom. The graphics are the strongest I have seen on a Dragon, showing not only the hedges at each location, but their changing appearance as you turn slowly round. You get subtle warning of the approach of the phantoms as well as a training program to allow you to get used to running round the maze. There are two types of maze in which you can play this game, and it is one of the most realistic, high-speed games that I have seen for some time, making use as it does of the sound and graphic potential of the Dragon.

#### US lead

It is clear that the American originators of this game have not wasted their 18 month head-start on us in 8088 programming skills, but it cannot be long before there are British games that are just as good. The extra time spent on writing in machine code is well worth it, if this is the sort of result that can be expected. Although Dragon Basic is better than Sinclair's version, it is not really good enough for high-speed action games, and it would seem that anyone considering this type of game would do well to acquire Lance Leventhal's excellent book, Programming the 8088.

With this in mind, it is perhaps surprising that there are so few cartridges of games available for the Dragon. It is comparatively easy to buy a couple of EPROMs with a good machine code program, as Dragon Data itself has demonstrated, seeing that the cartridge port on the Dragon is one of its main selling points. This would avoid the problems sometimes encountered with the cassette interface, although I am glad to say that none of these games gave much trouble in loading.

This concludes the selection of arcade-type programs that are available. With more and more games on the shelves in the High Street, it is good to see that originally we are neglected. Friends of mine seem to prefer the maze chase games to the alien-popping variety, and these are the games that help on a combination of hand-eye skills and logical thinking — perhaps a pointer for the way games should go in the future. ■

### Software reviewed this month

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### Dragon 32 Games Master



Published  
June 84

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# Jockeying to be first in the joystick race

*If your joysticks are worn out, or were never up to much in the first place, you now have a wide selection to choose from — Clive Gifford looks at the range.*

THE MOST POPULAR peripheral available for the Dragon must be the joystick. Dragon owners do not need extra memory packs or an add-on keyboard at the beginning, but some of the best arcade games need a joystick, and many utility programs benefit from control by a joystick which can be many feet away from the computer itself. In reaction to the limited

choice available last Christmas, many companies, both large and small, have started producing their own joysticks for the Dragon.

There are two basic types of mechanism — switch and potentiometer. The switch type consists simply of four or eight switches aligned with the X, Y and the two diagonal axes. Moving the column in a

certain direction activates a certain switch. The value given is either an 'on' or an 'off' and this type of operation can be said to be digital. The switch type, then, gives a less accurate value though it is usually more rugged, a good example of one being the Atari joystick. One variant of this type is the memory switch joystick which works using a similar principle to a spirit level and is found on the Atari Le Stick.

The potentiometer type allows diagonal movement and is altogether more sensitive. It gives a variable value of both the X and Y axes and can be described as an analogue operation. On the Dragon, with its extremely useful JOYSTICK command, it makes sense to use a potentiometer mechanism and in fact all eight of the joysticks reviewed use this system.

None of the eight can be described as semi-professional sticks, which are usually self-centering and one of a higher quality, aimed at the serious games player: most use a potentiometer system but with some you can choose the stiffness of action that you require.

## Easy action

The actual feel of a joystick is very subjective. I prefer an easy, fast action while other people stick with a stiff joystick. But the sensitivity and accuracy of a joystick is as important and is much less subjective. To test the accuracy of the joysticks, I used several programs of my own — a stopwatch and a racing game. To test the quickness of response, I used Microdeal's *Planet Ball*, a Pacman-type game with a complicated maze that requires many changes of direction.

I had heard of problems encountered with joysticks not reaching the extreme corners of the screen, and in fact the sheet of instructions supplied with the *Planet Shack* Tandy ones discusses this in some detail. However, none of the joysticks failed to reach any of the corners.

The first joystick I looked at was the official Dragon Data press. The old style joystick was a bulky affair in an unattractive case. It was poorly constructed though it had a solid stick movement and at £14.95 was fair value. The company has phased this type out and introduced a new, much more attractive style whose construction is very solid. Unfortunately the extra quality has put an extra five on the price (£19.95). This new style is a lot less bulky though it is still quite large, with the dimensions (excluding the actual shaft) being 4½ by 2½ by 1½ inches. The actual shaft was high (1½) and its movement was stiff. The fire button, square and situated on the top surface just behind the stick, has a nice clicking action. These were my favourite of the three types widely available through retail outlets.

The second pair I looked at were the Tandy/Atari Shack joysticks which, at the same price as Dragon Data's, are in direct competition. The Tandy ones are difficult to hold, being almost square (3 by 2½ by 1½ inches) in shape. I did not like the fire button on the front of the joystick: it is large and square shaped but with such a small pitch you hardly know when you have it.



More and more companies have started producing Dragon joysticks



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► pressed it. The stick's action was not too stiff but the plastic coating on the shaft kept turning round as I gripped it. This was a little annoying and at a price of £19.95, they are not the best on the market.

## Triplets

Microdeal's efforts are the third and final part out of the batch to be widely available retail. Its sticks bear more than a marked similarity to Midway's and Games, suggesting that they are all produced by the same manufacturer. Interestingly, these joysticks are being sold at different prices. The only visible distinguishing feature between the pairs is the screws used to secure the joystick housing.

These sticks are similar in shape to the new ones from Dragon Data and Cascom (covered later). They have a small, round firing button just below the stick which is fairly short at just over 1 1/2 inches high. All three of the joysticks had the same stiff movement. They all worked well in the three tests though I found them rather slow on the arcade game test. The pair that came from Midway, however, was obviously designed with the Australian market in mind. It featured a slightly different movement to any of the others when I pushed the stick down, the feel that I was controlling on the screen went up and vice versa! Thankfully, the left and right movement worked correctly, but quality control just isn't what it used to be. I'm sure, however, that Midway's other sticks are not like my pair. The cheapest of the three was Games at £15.95, with Midway's £15.99 plus 57p postage and packing, and Microdeal's a rather pricey £19.95.

The cheapest joysticks come from Taito Electronics. These were also the smallest in size (2 1/2 by 2 by 1 inches) and the lightest at 4 ounces. The joystick's mechanism are cased in the sort of box sold in



electronics shops for your own personal electronic projects, with a metal top finished with enamel paint. I imagine that these sticks are hand-made but there is no crime in that and in this case I think the metal phrase "small is beautiful" applies. These joysticks are easy to use with an excellent spring-suspended fire button on the front side. They are small enough to hold in your hand and offer good, fast control around the screen, their only failing is that they are a little too easy to move and this could be seen on the sketchpad program. Though they are a little unattractive, they work very well and at £15.95 inclusive of post and packing they are excellent value.

The Dragon Dungeon joysticks are priced at £19.95 which puts them in the Dragon Data/Tandy bracket. This joystick is unlike any of the others with a compact box measuring just over 3 inches long by 2 1/2 inches wide by 1 1/2 inches high. The fire button is raised on the top surface of the stick and is the best of the batch reviewed. The action of the joystick is also good, with only a tiny amount of pressure necessary to swing the shaft into any position. The whole unit has a quality feel about it. My only major complaint is that the shaft, only just over 1 inch high, was a little on the short side. Perhaps I'm biased in favour of the joystick because I achieved my highest ever score of 68,705 on Raster Ball compared to my previous

high of 32,336 using other joysticks!

The last joystick reviewed are the Cascom ones. These sticks cost a total of £19.79 including postage and compare favourably with some of the more expensive ones. They have a very similar design to the ones from Microdeal/Midway/Games, with the main difference being the larger shaft (at 2 inches), the longest of all the joysticks reviewed) and the much lighter feel which is somewhere between the stiff Microdeals and the easy Taito Electronics. The joystick lead was the shortest at 42 inches but this is still reasonable and can be easily lengthened. The lead on this joystick was of a much heavier duty than the others. This stick had a nice balance between the ease of movement and the accuracy. Unfortunately it was a little slower in some circumstances, but as a general joystick it cannot be faulted.

In conclusion, all of these joysticks are solidly constructed, well finished and easy to use. The best way to decide for yourself is to try and use a few different pairs. However, if you are prepared to order your joysticks by mail, I think you will get a better deal.

## Favourites

My favourite pairs are definitely those from Cascom, Dragon Dungeon and Taito Electronics. The Cascoms would make a good family joystick, while both the Taito and the Dragon Dungeon ones are ideal for test-driving situations if you can get used to their little idiosyncrasies. If you prefer a stiffer action joystick then the Games model at £15.95 must be considered.

It is a shame that no semi-professional joysticks are available as it would have been very interesting to review them against the standard types. But I'm sure that this more expensive type of joystick will start to arrive in Britain soon. ■

## Joysticks reviewed: from £15.00 to £19.95

**Taito Electronics**  
104 Woodbridge Road  
Fishburne St Andrew  
Dunfermline  
Fife KY11 1AA  
(0279) 21837

**Midway Computer Company**  
Roxburgh Road  
Hawthornhill Road  
Roxburgh  
Dunfries  
(0275) 144  
(0275) 866751

**Dragon Data**  
Available through retail outlets  
such as Buxton and  
Selling Microsystems  
241 Baker Street  
London NW1 6XJ  
01-486 7871

**Games**  
Farnham House  
302 Townlands Road  
Winford  
Cheshire  
(0895) 51174

**Price:** £15.95 a pair  
including postage  
**Weight:** 4oz

**Price:** £15.95 a pair  
plus 57p p&p  
**Weight:** 6 oz

**Price:** £19.95 a pair  
(the previous model  
at £14.95 a pair  
is no longer  
available)  
**Weight:** 5 1/2 oz

**Price:** £19.95 a pair  
including postage  
**Weight:** 6 oz

**Microdeal**  
41 Thorne Road  
St Austell  
Cornwall  
PL25 5JE  
(0728) 87676  
also available from  
other dealers (see p. 68)  
**Chromasoft**  
48 Junction Road  
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**Cascom Computer Accessories**  
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company's best retail  
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**Dragon Dungeon**  
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Dunbarton  
G82 1AD  
(0355) 62828

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**Weight:** 6 oz

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plus 75p p&p  
**Weight:** 6 oz

**Price:** £19.95 a pair  
**Weight:** 5 oz

**Price:** £19.95 a pair  
including postage  
**Weight:** 6 oz



# Boots provides a firm footing for Dragon's future

**Graham Cunningham** talks to **Anton Boyes** of **Boots** the chemist, whose move into home-computers has contributed to the **Dragon's** success.

DID YOU buy your Dragon at Boots? The chances are that for one in three of you the answer will be yes, because Boots estimates that about one-third of Dragons sold so far have passed over its counters. The chances are that you will also be a happy Boots customer — because the company reckons that fewer Dragons are returned as faulty than any other machine.

Even if you didn't buy your machine at Boots, it is a place worth checking for Dragon software and add-ons. For example, the company expects to be the first place selling the new disk drive system from Dragon Data.

Boots itself is a happy customer of Dragon Data. In the words of Anton Boyes, who is responsible for organising Boots' home computer sales: "It would be an understatement to say that we are tremendously pleased with the Dragon."

Boots' move into home computers began with less than a dozen of its larger stores selling Vic20s and Texas Instruments' 1500. In August last year the number of stores rose to 60 and the Dragon made its debut, appearing in Boots' outlets that month. More than 130 stores, covering every major city centre, stock the Dragon now, and the aim is to reach 200 before the run-up to Christmas this year.

Boots' first sight of the Dragon, in pre-production form, was in May last year. At the time Boots was looking at "everybody who was in the mar-

ket" with a view to expanding its home computer sales. When they saw the Dragon they "were very impressed — it selected itself".

According to Boyes, the Dragon beat off rivals because it was "effectively a finished product" with a large memory and high-quality graphics. The fact that the Dragon resembled a typical computer terminal, with a proper typewriter keyboard, also stood in its favour.

The BBC micro was not a proposition then because they were only being offered through retail order. Nor was Sinclair's Spectrum ready at that time.

Central purchasing of home computers is handled by Boots' stationery and book merchandise department which also covers toys. An established relationship with toy manufacturer Meccano, Dragon Data's parent company until it went independent last November, also eased the way to acceptance.

## *Sales of the T1000s were slow and the system was dropped*

Since that August debut, Boots' microcomputer sales, including the Dragon as its "leading line", have not looked back. The most recent estimates say that 55,000 Dragons were sold up to the end of this February. And Boots thinks that it accounts for one-third of all Dragon sales. As Boyes says: "It is a

line with which we have associated ourselves."

But Boots has no objection to actively also selling the Dragon. It achieved its strong supply position not by contract stipulations with Dragon Data but by the size of the orders it placed for the machine.

The Dragon is only part of Boots' home computer drive. The first trials yielded "small-

ish sales" of the Vic20, and even fewer T1000s were sold — "not in hundreds, but in dozens". The T1 system was finally dropped towards the end of last year. But the August move into 80 stores, with the Dragon selling alongside the Vic20, was a success.

Boots has expanded its range since then — it began to stock the ZX81 in the run-up to



Boots' move into selling home-computers began in strength last autumn





Andy Boyes: "It would be an understatement to say that we are immensely pleased with the Dragon."

Christmas and the Seedcorn in February. At the top end of the home computer market it sits above the Commodore 64.

Last Christmas the Vic20 sold strongly, and Boots would sell more if it could get hold of them. At Christmas more Dragons could also have been sold, but the company has no complaints about supplies.

"We have had a very fair share of Dragons," Boyes said.

Boots has put as much effort into how it sells micros as into which machines to stock. Each store's home computer section is "very obviously a separate unit" with enough space for a customer to experiment with all the machines in stock. The Dragon is set up with a Boots Thomson 14-inch tv and either a flush 3190 cassette recorder or one of the two Boots models which is compatible with the Dragon.

Boyes added that sales staff have been given special training in microcomputers, ranging from going back to college to studying manuals. The training continues and is given a "high priority". The aim is for sales staff on the spot to provide "good advice that is not intimidating".

### *"Packaging in general often lets down the software"*

Also in stock is a range of software, although Boyes commented: "We thought Dragon software suppliers were a bit slow off the mark." The notable exception was Microdeal, whose Space War, Donkey Kong and Planet Invaders need the lot of Dragon best-sellers at Boots. Utilities packages for education and games are selling more slowly, but Boyes is not discouraged by this. "They will make a market in the long term."

He is "greatly relieved" that the standard of packaging is going up. New presentation packages for Dragon Data's software are ready — after Boots had spent some time pressing for an improvement. "The packaging in general often lets down the software," he explained.

Boots is keen to increase the range of packages it stocks. A panel of users — the Boots Computer Club, in fact, which is based in Nottingham — checks the quality of all the software before Boots will agree to stock it.

The company's hardware testing is also thorough. Out of every 1,000 machines it receives a batch tests 80. Boyes commented that customers returned fewer Dragons, at least than any other system. He thought the failure rate "was surprisingly low for such a high technology product". When a customer does bring a machine back, a diagnostic cassette, supplied by Dragon Data, is used on the spot to check the major functions.

All of the Dragons sold so far are still within their guarantee periods. Boots is setting up a system of service agents to provide support when the guarantees start to expire.

The good relationship with Dragon Data is set to continue despite the fact that Boots will talk to all the major manufacturers about selling their products. At the moment the company has no plans to stock the Lynx, a major rival, considering that the Dragon remains "the home user's ideal machine".

In fact future models from Dragon Data hold more appeal to Boots. As Boyes said: "We would look very favourably at stocking any Dragon machine which falls within our market — the home user." Even the possibility of selling a bigger, business machine cannot be ruled out in the long term.

### *Selling a business machine cannot be ruled out*

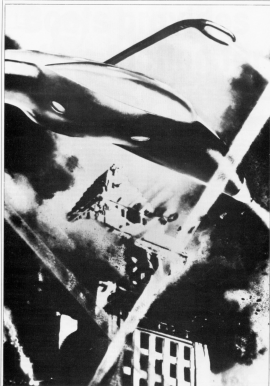
Demand for the present Dragon is still high. Partly this is due to a backlog built up over Christmas, but Boyes also puts it down to the "idea of home computers striking a chord generally in the UK". A national advertising campaign this spring is expected to boost demand for home computers even further.

The Dragon 32 is to get a boost itself this spring. Boots will be selling the 64K upgrade along with the Dragon Data disk system as soon as it is available. The drive will cost about £275 including the controller. Boots also plans to start selling the Sokosita printer compatible with the Dragon for about £260 including the connecting cable.

So new products will not displace Boots' affection for the Dragon. As Boyes said: "We feel very close to this product. He himself feels closer still — he has a Dragon at home for practising programming and sometimes testing software. ■









# Your chance to program and repel the aliens

Save the earth from the alien invaders with **Andrew Black's** Dragon version of *Missile Command*.

DEFEND EARTH'S FOUR remaining cities from the missiles of the alien invaders, using this variation of *Missile Command*. Destroy the invaders with your laser — which you move with a joystick (right) and fire using the space bar. If this is achieved, place the joystick on a flat surface and move with one hand and fire with the other.

## Instructions

1. Maximum number of missiles — this is the number of missiles to be fired before the game ends.

2. Skill levels — there are two types of difficulty:

Levels 1-3: one missile at a time

Levels 4-6: two missiles

Levels 7-8: three missiles

Levels 1, 4 and 7 — you only have to be three spaces away to destroy a missile

Levels 2, 5 and 8 — two spaces

Levels 3, 6 and 9 — one space

3. Angle — this is the maximum move that a missile can make in one turn (left or right)

4. Moving — use the joysticks (or the

arrow keys — as explained below)

## Program notes

0-150

20

160-230

240-320

330-370

380-600

610-640

660

680-820

830-720

730

## Main variables

X and Y — coordinates of your laser

MX(Z) and MY(Z) — coordinates of the missiles

TC — total number of cities remaining

C(Z) — cities remaining

B — angle of movement by missiles

L — skill level

S — your own particular score

H\$ — high score

M — number of missiles

MS — movement using keys and firing

N — number of missiles fired

MM — total number of missiles allowed

J — joystick value

RS — repeat key

P — position of explosion centre

W — random movement of missiles

## Key movement

To move the laser with the keys (you can't move diagonally, if you do, it's harder) replace lines 270-300 with the following lines:

```
265 IF H$ = "" THEN MS = ""
```

```
270 MS = INKEY$. IF MS = "" THEN MS = RS
```

```
275 RS = MS
```

```
280 X = X - 2 * (MS = CHR$(8)) + 2 * (MS = CHR$(9))
```

```
290 Y = Y - 2 * (MS = CHR$(10)) + 2 * (MS = CHR$(14))
```

```
300 X = X + 2 * (X > 255) - 2 * (X < 0) : Y = Y + 2 * (Y > 175) - 2 * (Y < 0)
```

```
0 CLS : INPUT "MAX NO OF MISSILES": MM
1 IF MM < 0 OR INT(MM) <= MM THEN 0
10 REM MISSILE COMMAND
20 FORS & HFF07:0
30 CLS : X = 120 : Y = 90 : TC = 4 : S = 0
40 FOR Z = 1 TO 4 : C(Z) = 1 : NEXT
50 INPUT "ENTER — SKILL LEVEL (1-9)": L
60 IF L < 1 OR L > 9 OR INT(L) <= L THEN 60
70 INPUT " — ANGLE (1-3)": B
80 IF B < 1 OR B > 3 OR INT(B) <= B THEN 70
90 IF L < 4 THEN M = 1 : GOTO 120
100 IF L < 7 THEN M = 2 : GOTO 120
110 M = 3
120 ON L GOTO 130, 140, 150, 150, 150, 150, 150, 150
130 A = 3 : GOTO 160
140 A = 2 : GOTO 160
150 A = 1 : REM A = NO OF PIXELS AWAY
160 PMODE3,1 : SCREEN 1:0 : POLS 1 : COLOR 3,2
170 IF TC = 0 THEN 830
180 IF C(1) = 1 THEN CIRCLE (10,10),10,4 : PAINT (10,10),4,4
```

```
190 IF C(2) = 1 THEN CIRCLE (64,10),10,4 : PAINT (64,10),4,4
200 IF C(3) = 1 THEN CIRCLE (100,10),10,4 : PAINT (100,10),4,4
210 IF C(4) = 1 THEN CIRCLE (245,10),10,4 : PAINT (245,10),4,4
220 DRAW "CA, BM10,10; E10, F10"
230 PAINT (100,10),4,4
240 GOSUB 330
250 GOSUB 580 : GOSUB 660
260 GOSUB 730
270 FOR Z = 0 TO 1 : J(Z) = JOYSTRT(Z) : NEXT
280 X = X - 2 * (J(0) > 50) + 2 * (J(0) < 0) : X = X + 2 * (X > 255) - 2 * (X < 0)
290 Y = Y - 2 * (J(1) > 50) + 2 * (J(1) < 0) : Y = Y + 2 * (Y > 175) - 2 * (Y < 0)
300 MS = INKEY$
310 IF MS = "" THEN GOSUB 660
320 GOTO 260
330 FOR Z = 1 TO M
340 MX(Z) = RND (255) : MY(Z) = 0
350 NEXT
360 N = N + M
```

Continued on page 24



```

570 RETURN
580 FOR Z = 1 TO M
590 W = RND(2)
600 MX(Z) = MX(Z) - B * (W = 1) + B * (W = 2) :
MY(Z) = MY(Z) + 1
610 MX(Z) = MX(Z) + B * (MX(Z) > 255) - B *
(MX(Z) < 0)
620 IF POINT(MX(Z), MY(Z)) = 4 THEN 480
630 IF MY(Z) = 151 THEN MX(Z) = RND(255) :
MY(Z) = 0 : N = N + 1
640 IF N = MM THEN 630
650 PSET(MX(Z), MY(Z), 3)
660 NEXT
670 RETURN
680 IF MX(Z) < 21 THEN C = C + 1 : C1 = 0 : P =
10 : GOSUB 510 : GOTO 170
690 IF MX(Z) < 75 THEN C = C + 1 : C2 = 0 : P =
64 : GOSUB 510 : GOTO 170
700 IF MX(Z) < 129 THEN P = 128 : GOSUB 618 :
GOTO 630
710 IF MX(Z) < 203 THEN C = C + 1 : C3 = 0 : P =
182 : GOSUB 510 : GOTO 170
720 C = C + 1 : C14 = 0 : P = 245 : GOSUB 510 :
GOTO 170
730 FOR D = 1 TO 300 STEP 3
740 CIRCLE(P, 191), 0.4
750 NEXT
760 POLS 2 : RETURN
770 CIRCLE(X,Y), 3.3 : RETURN
780 LINE(128,175) - (X,Y), PSET
790 FOR Z = 1 TO M
800 IF X > = MX(Z) - A AND X < = MX(Z) + A
THEN 610
810 NEXT

```

```

820 LINE -(128,175), PSET : RETURN
830 IF Y > = MY(Z) - A AND Y < = MY(Z) + A
THEN SOUND 100,1 : MX(Z) = RND(255) :
MY(Z) = 0
840 N = N + 1 : IF N < MM THEN 500
850 PLAY
860 "T8V1046L3C00GCD0F0C0F0B0C0H4L3C"
870 CLS
880 PRINT @ 255, "YOUR SCORE"; S
890 IF S > HS THEN HS = S
900 PRINT @ 320, "HIGH SCORE"; HS
910 PRINT @ 352, "DO YOU WANT ANOTHER GO
(Y/N)?"
920 SCREEN 0,1
930 RS = INKEY$: IF RS = "" THEN 700
940 IF RS = "Y" THEN 0
950 IF RS = "N" THEN 0 ELSE 700
960 CIRCLE(X,Y), 3.3 : RETURN

```



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## LOAD AND GO WITH YOUR DRAGON

THE UNIVERSITY OF CHICAGO PRESS

- Games: Pairs
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  - Sentences and Ladders
  - Ski Run
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**Abstract**

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# Delights of the open road

As a taster to their new book, *'Dragon Games Master'*, Keith and Steven Brule explain how to construct a simple game which will test your skills as a player.

**CHRGD3** GOEND A winding road, dodging obstacles in a race against time — this may sound complicated but it can be done in a program of less than 40 lines. And once you understand how to produce a scrolling screen display you can incorporate it into your own programs to make them more exciting.

First we must start out what different sections we will have to include in the program, and in what order we need to deal with them. The following are the major items to be considered in the development of the program in a sensible order of priority:

- 1) Draw the road
- 2) Place random obstacles
- 3) Put your car on the road
- 4) Take control
- 5) Test for collisions
- 6) Display time and distance
- 7) Create a way of winning the game
- 8) Make the program user friendly

The first question to consider is how to display a single strip of black terrain, although this is really no problem as we could simply give the used black graphic (byte) **CHRG(128)** ten times.

```

80 PRINT CHR$(128);CHR$(128);
  CHR$(128);CHR$(128);CHR$(128);
  CHR$(128);CHR$(128);CHR$(128);
  CHR$(128);CHR$(128);

```

On the other hand, if you think a moment, you will realise that instead of having to type out **CHR\$(128)** ten times you can use the **STRING\$** function. This will create a string of specified length filled with one particular character. The improvement is carried out by defining the road strip as **AS=STRING\$(10,128)** and then printing **AS** whenever you want to show this.

```

30 AS=STRING$(10,128)
60 PRINT AS

```

If we now add a return line and **RUN** we will get a straight black road which starts at the top left of the screen and runs down the left hand side until it reaches the bottom, when the screen will automatically scroll so that printing of the road continues.

```
120 GOTO 30
```

Although this works okay most real roads are not quite like that, so what about moving the road to the centre of the screen for a start? This can easily be achieved using the **PRINT TAB** command to move the print position to a specified column on the screen.

```
50 PRINT TAB(10);AS
```

The road is now printed down the centre

of the screen but it is still dead straight and very unrealistic, so the next step is to make the road wind about. Let's set the start print position (**A**) at column ten and then produce a new random variable **B** which is added to **A** to produce the print position. **B** is produced by **RND(3)-2** which will return -1 (1-2), 0 (2-2), or 1 (3-2), thus leaving the road to run straight, or making it deviate one column to the left or right after each calculation.

```

10 A=10
30 B=RND(3)-2: A=A+B

```

## Wandering

You will see that the road now winds about on the screen but besides, if you leave it to wander long enough, you will get an **FC ERROR** (read the thought). If the **TAB** position becomes negative, or the road will wrap around into the next line, if it moves too far to the right, causing total confusion.

Clearly some limits need to be set for the **TAB** position and this can be done by checking **A**. We will set the left limit at 1 and the right limit at 20 (if we leave enough room to the right of this to print the whole width of the road section without wrap around).

```

40 IF A<=0 THEN A=0
50 IF A>1 THEN A=1

```

We now need to place our obstacles on the road — as yellow ones should be rare and easy to see we'll use **CHR\$(159)**. Variable **C** will be a number from 0 to 31, inclusive and the obstacles will be placed by **PRINT** (i.e. Make sure that you remember to include that semicolon after **CHR\$(159)** in the road to the right of the obstacle will revert to green. It is essential to include the second **PRINT** in statement in the line as this moves the print position down to the bottom right-hand corner of the screen so that the screen scrolls before it starts to print the next section of road.

```

110 C=RND(32)-1:PRINT=(C+48);
  CHR$(159);PRINT=" ";

```

One thing that you will soon notice is that the obstacles are not always printed on the road itself, but may appear anywhere on the screen. This is because **C** can be any number from 0 to 31 and therefore they can be printed on any column right across the screen.

This can be easily rectified if we make a new variable **D** (a random number from 0 to 11) and then add this to **A** which is the variable which actually determines how far

across the screen the road is placed, to give **C** instead. The limits for **C** are now from **A** to **A+11**, which must fall on the road.

```

110 D=RND(11)+1: C=D+A:PRINT=(
  48+D-C);CHR$(159);PRINT=" ";
  (224+D-C);PRINT=" ";

```

The next stage is to put your car on the road: it is positioned near the centre of the screen by creating a new variable **E** (print value 15), adding this to 224 (a print position near the centre of the screen), and then **PRINT**ing an inverse U at that position to represent the car.

```

10 A=10: E=15
110 D=RND(11)+1: C=D+A:PRINT=(
  48+D-C);CHR$(159);PRINT=" ";
  (224+D-C);PRINT=" ";PRINT=" U";

```

You will notice that the car leaves a trail behind it as it travels. To be able to wipe this out after each move, we need to remember the old value of **E** (the last position of the car) as the new variable **L**. Then, print a black space in the equivalent position on the line above — this will cover the old car as the screen scrolls. Note that it is on the line above the current car position that the trail must be blocked out, because the car actually starts at where it is positioned by **PRINT** in while the road moves as the screen scrolls.

```

10 A=10: E=15: LP=15
110 D=RND(11)+1: C=D+A:PRINT=(
  48+D-C);CHR$(159);PRINT=" ";
  (224+D-C);PRINT=" ";PRINT=" U";
  LP=E

```

You should now have a winding black road with yellow obstacles on it, and a car which is sometimes on the road, but which more often than not is off. The next stage is to put the car under user control with the cursor keys.

It would be perfectly correct to use a series of **IF-THEN** checks for **INKEY\$** but a simpler and quicker way is to use the logical check in the line below:

```

70: IN=INKEY$: IF IN=<="" THEN IN=0
  L&=ASC(IN)
  E=E+(IN=>0)-(IN<0)

```

## Breakdown

This line is easier to understand if it is divided into parts for explanation:

```
IN=INKEY$: (Read INKEY$ into IN)
```

```
IF IN="" THEN IN=0
```

```
(If no key pressed jump to)
```

```
ELSE F=ASC(IN):
```

(If a key was pressed then set variable **F** to the **ASC()** value of that key)

```
E=E+(IN=>0)-(IN<0)
```

(Increase (+1) or decrease (-1) the position of the car relative to the left side of the screen (**E**) according to whether the left arrow (**IN=>0**) or the right arrow (**IN<0**) was pressed. This works because (**IN=>0**) and (**IN<0**) will return either **TRUE** and 1, or **FALSE** and 0.)

Left and right are not the only directions in which we can control movement. A simple way to provide a two-speed game is to take advantage of the ability of the Dragon CPU to operate at 0.8 MHz or 1.6 MHz. The higher speed is obtained by **POKE** & **HITF03** and the lower speed by **POKE** & **HITF06**. ■



As the Dragon 32 was never designed to run at 1.8 MHz it is possible that your particular machine may not work correctly at the higher speed due to problems with the memory. But when it will work (perhaps most of the time in our experience) it is a very easy way to put two speeds into games.

You will notice that it also increases the frequency of the sounds produced, but you may not realise until too late that it also distorts the cassette load/store routines so that your recordings are useless, unless you make sure you switch back to low speed first.

The program automatically ends on low speed but if you stop it with the BREAK key you might not be at high speed. If you are not sure of the current situation always POKE \$A0F0D0 before attempting to load or save.

The speaker is used to toggle between the two speeds by setting a master variable M to indicate the speed status with M=0 being slow speed and M=1 being high speed. If the joystick is pressed (JF=32) and the CPU is at 0.8 MHz (M=0) then speed is increased and M set to 1. Similarly if M=1 the speed is decreased and M set to 0. In practice this means that if you hit the speaker when you are in bottom gear you go up to top gear, and if you hit the speaker when you are in top gear you go down to bottom gear.

```

80 IF P=32 AND M=0 THEN POKE
  &HFFD0, M=1 : GOTO 100
80 IF P=32 AND M=1 THEN POKE
  &HFFD0, M=0

```

## Joysticks

The second method of control, which can be used very effectively here, is the joystick. The stick can be used for left and right movement and the joystick button to change gear. The line which controls direction must be changed to suit the joystick but it is very similar in effect to the line used for key control.

```

70 JF=JOYSTICK()
E=E+(JF*10)-(JF*50)
JF is the value of JOYSTICK() (right joystick value to side axis) and E is the same as with key control. If JF is less than 0 then E is decremented and the car goes left and if JF is less than 50 then E is incremented and the car goes right.

```

To change speed substitute the joystick button PEEK check for speaker detection.

```

80 IF PEEK($280)=126 AND M=0
  THEN POKE &HFFD0, M=1 :
  GOTO 100
80 IF PEEK($280)=126 AND M=1
  THEN POKE &HFFD0, M=0

```

You have probably realised by now that you can drive wherever you like! Although some people may prefer a line that, even if they may want to know how many old ladies they have knocked down.

Once again we can PEEK at the screen to see what our situation is, with the added twist being if the square the car is about to move is a red block (CHR\$(128)) then END.

```

100 IF PEEK(1024+224+E)<>128
  THEN END

```

```

5000 GOTO 10000000
5010 END
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9930 REM ***** END *****
9940 REM ***** END *****
9950 REM ***** END *****
9960 REM ***** END *****
9970 REM ***** END *****
9980 REM ***** END *****
9990 REM ***** END *****
10000 REM ***** END *****

```

Full listing of the game is sent out for details.

A new problem has now arisen at the beginning of the game: before the screen starts to scroll the road does not reach to the centre of the screen, leaving the car stranded in the middle of a hole and halting the game to an end as soon as it starts. We therefore need to print some extra road sections at the start of the game on a 'lane' and for all lanes.

```

20 AS=STR$(50/128) FOR N=1 TO
  16: PRINT TAB(16);AS;NEXT N

```

Now every time you hit an obstacle on the road, or you leave the road, the game ends. More interesting would be some way of accumulating damage to the car each time you hit something. We decided the best thing to do was to add 1 to a damage variable (DA) every time you hit a yellow block (CHR\$(128)), and add 5 onto DA every time you hit green (CHR\$(65)) by leaving the road. Notice that the green produced here where nothing is printed is CHR\$(65) (a space), rather than the green graphic block which is CHR\$(143).

Since things are getting rather more complicated it is best to put this part into a subroutine which is only reached if the character at the next print position is not blank. Suitable audible warnings have also been included, and if your damage reaches 50 until the game comes to an end.

```

100 IF PEEK(1024+224+E)<>128
  THEN GOSUB 200
200 H=PEEK(1024+224+E)
210 IF H=128 THEN DA=DA+1 :
  SOUND 100,5
220 IF H=65 THEN DA=DA+5 : SOUND
  50,1
230 IF DA=50 THEN 300
240 RETURN
250 END

```

So far the game only consists of driving down a road dodging obstacles, so why not consider the time taken and distance travelled? The TIMER is set to zero by TIMER=0 and the actual time read by the variable TI which is set to 1/50 of the TIMER count to give seconds. Distance travelled (DI) is incremented by 1 in each

```

1000 DI=DI+1 : PRINT DI : GOTO 100
1010 DI=DI+1 : PRINT DI : GOTO 100
1020 DI=DI+1 : PRINT DI : GOTO 100
1030 DI=DI+1 : PRINT DI : GOTO 100
1040 DI=DI+1 : PRINT DI : GOTO 100
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1070 DI=DI+1 : PRINT DI : GOTO 100
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3900 DI=DI+1 : PRINT DI : GOTO 100
3910 DI=DI+1 : PRINT DI : GOTO 100
3920 DI=DI+1 : PRINT DI : GOTO 100
3930 DI=DI+1 : PRINT DI : GOTO 10
```



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# Let Topsy take the strain from machine coding

**Pam D'Arcy** introduces *Topsy*, which promises an easier method of entering machine code.

FOR THE MCRNCI, machine code programming is daunting enough without the tedious business of converting hex values to decimal or prefixing hundreds of basic data statements with "data".

This program allows you to enter the code as strings of hex with addresses in hex or decimal, leaving TOSY for the actual program. Once loaded the code can be both saved and run using simple action codes.

The program came about by my wanting an easier method of entering machine code that having to convert hex values to decimal or having to prefix every byte with "data" for Basic DATA statements. However, like Topsy, "it grew" to include list routines, and SAVE/Load facility and so on.

## Flexibility

Topsy is much more flexible than for any machine code use. It enters machine code as hex strings without separators and relocates machine code to a lower load address. The standard powerful feature of the Dragon enables addresses to be input in either decimal or hex (preceded by "data") format — at suits the circumstances of the moment.

Using Topsy, about 12K bytes is available for machine code programs (more if you and HIBIT and debased screen instruction points, on entering the program). And there are no artificial machine code bounds — it is simply under the user's control and can be altered during the program's operation.

Topsy allows facilities to be quite useful if you have accidentally asked for, say, the load or save facility and limits writing to store to your specified reserved machine code area. This is for your safety as the Dragon hangs up if you attempt to write to Ram. When testing and writing to areas above Ram, I obviously corrupted something vital and lost — not once, but about four times — lengthy sets of applied program amendments. This was because I put the CSAVE facility out of action and hadn't saved the program prior to testing it (this I have learnt now).

Detailed descriptions on using the facili-

ties are not described in this text as they can be read straight from the accompanying program listing, but a program synopsis may be useful.

To avoid confusion when entering the program, the letters I, O and U have not been used in variable names. Apart from the G numerics and the P and R string variables, other variables have single character names (the G, P and R variables have two character names). Variables J to R are string variables, all requiring the \$ suffix, all others are numerics.

Understanding the G variables will assist you should you want to amend the constraints of the system or individual facilities within the system. These variables are initialised (subroutine lines 3370-3770) on initial entry to the program and after every memory reservation requested (action code V).

G4: Clear strings value — it is set to 880 in case any bright spark tries to find a program error by entering a full buffer of hex characters in one go. Experiment to find a suitable lower figure to match your needs. I only intend to enter an equivalent line of Assembler coding at any one time. If you are only interested in entering, say, a maximum of 25 bytes (50 characters) of hex in a single write entry, a setting of 250 is more than adequate, freeing an additional 880 bytes of store.

G8: Highest address to permit a write to — set to 32767 for reasons stated above.

G9: Current highest address available for use by the Basic program (= current lowest address reserved for machine code + 1).

G9: Calculated approximate highest address +1 that the currently loaded version of Topsy requires for the Basic program to run in.

G2 — G4: Store bounds for the various facilities.

G7: The value that the string storage reservation is reset to at the end of the run — set to 290.

A list of facilities follows:

Action code V: Optional Memory Reservation: Entered automatically at the start and end of a run when requested (often useful to refresh your memory of where you can

use). It gives details of the current lowest reserved for machine code address and available space (start address (lines 79-100).

Action code M: Write Machine Code: Allows hex characters to be input as a plain character string. Requires hex characters to be entered for each byte (being the most and least significant half-byte respectively) but needs no byte separating characters nor other hex overheads (Lines 480-660).

Action code S: Save Machine Code: Experience shows that it is wise to save your hard machine code entry efforts prior to trying an initial trial in case of disaster. The save permits the machine code entry point to be specified as either the actual address (as is required by Basic) or as an offset, which may be more useful on occasions. Topsy then converts this to the actual address for the save (lines 680-1180).

Action code A: Execute machine code: Allows any machine code currently in store to be executed (Lines 1380-1400).

Action code L: Load machine code: Allows existing machine code programs (or data saved as a machine code file) to be loaded from cassette (Lines 1180-1370).

## Re-saving

Action code C: Copy store to store: As machine code programs cannot be loaded at a lower address than saved from (have you tried a negative offset?), this facility allows an existing (relocatable) machine code program to be loaded, copied to a lower address and re-saved from that lower address (Lines 1480-1630).

Action Codes R, D: List store: Two useful facilities for checking hex strings written moved in store — or for just browsing through memory. There is a hex listing (my with 8 bytes to a line and a detailed listing (D) where each byte is displayed in hex, decimal and printable character format, one byte per line (hex list: lines 1640-1800; Detailed list: lines 1810-2170). End of run (D) on main menu). Casedown routine: lines 218-260.

Subroutines: Lines 2180 onwards are various subroutines, mainly printing of rates and instructions on using facilities. ■



# TELEWRITER™ the DRAGON 32 Word Processor

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### Entering machine code

[illegible][illegible]

### Dumping the screen content into the printer

**ONCE LOADED.** This position independent 51 byte machine code program may be used by issuing an EXEC statement, either through the keyboard or from within a program. It dumps the entire current content of the screen to the line editor.

Obviously, should you wish the top line of a full screen to be printed, the full screen must be made from within a program.

As input through the keyboard will scroll the top line off the screen. Very interestingly, the first efforts were thwarted by the fact that screen text characters, except for the caps range, differ somewhat from the ASCII codes.

The program can be easily entered using the Tapesy "write hex storage" facility (and be saved and tested). It can be entered at any "prompt" by machine

Code address in the listing — the universal linking has program start address on the listing area because I entered the program through Tcopy at address 77000.

The program as listed prints 32 characters to a print line. Should you wish to alter this to a 64-character print line (ie 2 screen lines per printer line), simply alter line 17 to `64*80` (see code).

line	addr	objectcode	label	op	comment
01	6978	860D	START	LDA ##0D	start print with cr
02	697A	BD800F		JSR ##800F	
03	697D	8E0400		LDX ##0400	text screen address
04	6980	108E0200		LDY #512	length of screen buf
05	6984	A460	NEXTCHAR	LDA ,X+	
06	6986	817F		CMPA ##7F	start graphics chr=1
07	6988	226E		BHI PRINT	
08	698A	8120		CMPA ##20	
09	698C	2264		BHI NOTLOWER	
10	698E	8A60		DRA ##60	correct print char
11	6990	2006		DRA PRINT	
12	6992	9160	NOTLOWER	CMPA ##60	
13	6994	2502		BLD PRINT	cap charchk
14	6996	84DF		ANDA ##DF	correct print char
15	6998	BD800F	PRINT	JSR ##800F	output to printer
16	699B	1F10		TFR X,D	check for new line
17	699D	C41F		ANDB ##1F	addr/32
18	699F	2405		BNE DECCOUNT	
19	69A1	8A60		LDA ##6D	yes - do if(crl
20	69A3	BD800F		JSR ##800F	
21	69A6	313F	DECCOUNT	LEAY -1,Y	
22	69A8	24DA		BNE NEXTCHAR	
23	69AA	3F		RTS	output complete





Tandy's Colour Computer (CO-201) — based on the 6800 family.

# Same chips, but a different cup of Coco

*How alike are Tandy's Colour Computer and the Dragon? George Saint looks inside both to bring you the answer.*

A MYTH HAS developed about the Dragon's similarity to Tandy's Colour Computer. In fact the answer to the question "Is the Dragon the same as the Colour Tandy Computer?" is — "No".

This needs qualifying, since there is a great deal of similarity between the machines, and approximately a 95 percent external similarity to the user. Unfortunately, it is the 5 percent difference that can cause all the problems to the unwary programmer — this article is concerned with highlighting the differences.

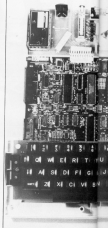
## Hardware

Both the Dragon and the Coco (Colour Computer) are based on the Motorola 6800 family of chips. These are the 6800 CPU (Central Processing Unit), the MC6801 SAM (Synchronous Address Multiplexer), the MC6807 VDG (Video Display Generator) and the MC6821 PIA (Peripheral Interface Adapter). These four chips together with some RAM form a

surprisingly powerful computer needing very few other electrical components — it is with this concept that Dragon Data and Tandy have designed their machines.

The fact that the 6800 chip is compatible with the earlier 6800 source code, and that new addressing modes are available to the programmer, makes it the most powerful 8-bit processor generally available on the market today. The speed of the CPU is about 89 MHz (Dragon Data has changed the external crystal oscillator from 14.31818 MHz in early machines to 14.226 MHz in later machines to improve picture quality). At this speed, the relative processor execution times compare very favourably with a 4 MHz Z80A-based computer system.

The 6800 chip is a half-way house to 16-bit machines, and offers program/picture independence (a program will execute properly when placed anywhere in the memory map), and true program re-entrancy (a subroutine can be shared by



The most important difference between the two.

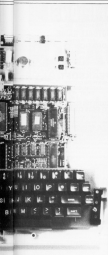
several tasks concurrently, without destroying the return address by nesting subroutines). This means that we can expect to see other high-level languages such as Pascal, Fortran and Cobol emerging on the expanded disc-based Dragons.

## Pseudo colours

You may have wondered why on a colour computer, high resolution arcade games are offered in black and white, when a range of colours could be offered on a lower resolution with very little reduction in display quality. The very best arcade games are of the moment written in America for the Coco, and are rewritten to run on the Dragon. Unfortunately, our American cousins have an advantage over us in that they can generate pseudo colours (red, blue colour artefacts) in PICOBA by placing the available colour pixels very close together to generate a pseudo colour on their television sets.

The catch is that the American TV





It lies in the Dragon's 32K Rom

operates at 525 lines, and can take its signal directly from the output of the VDG chip, whereas the English PAL television operates at 625 lines, so extra circuitry is needed to convert the signal. This effectively stops any pseudo colour generation and offers to us only the two-colour high resolution mode favoured by the American programmers.

This is a great pity, since some startling effects have been achieved with the colour anafactor. Both the Dragon and the Coco suffer from this problem, so is the better picture quality of the Coco due to a different circuit design for the 625 line conversion? I will leave the reader to make his own mind up on this.

The most important difference between the two machines for the Dragon user is the 32K of Rom which he gets with the machine, as opposed to the 4K or 16K, Coco, together with the full extended Microsoft Colour Basic. The Coco can be upgraded to the 32K and the Extended

Colour Basic, but by the time this is carried out, the price gap between the two machines gets even larger.

The best improvement over the Tandy machine is the provision of a parallel printer interface instead of a serial interface. This means that high speeds of printing can be carried out, and cheaper parallel printers can be used for this purpose. A serial port for the expansion slot will probably appear in the future, so those of you who want to transmit messages over the telephone line will not be disappointed.

The connections to the expansion slot are the same for both machines, so that it is possible to run Coco cartridges (if the software is compatible).

To sum up on the hardware side, the two machines are very similar, and the TRS-80 Colour Computer Technical Reference Manual will give a very close insight to the circuitry of the Dragon, although it must be kept in mind that there are changes, and close scrutiny should be made to the circuit board if hardware modifications are attempted.

Both Dragon Data and Tandy have purchased the Microsoft Colour Basic interpreter. This is the only colour Basic interpreter available at the moment for 6809 based computers, but both companies approached the installation of the interpreter in a different way.

Tandy originally offered a non-extended Basic machine, where the interpreter resided in memory in the region A000 to BFFF (all addresses referred to here are in hexadecimal). As an optional (necessary) extra, the extended Rom was offered for an additional sum of money, and this stored into memory in the region B000-BFFF, so that both Roms worked together, 'hooks' were written into the non-extended Rom which diverted flow to the direct page, and then to the extended Rom if it was present.

The first version of the Tandy Basic (1.0) suffered a bug in the joystick routine, so that when a joystick value was accessed, garbage appeared on the screen. The later version of the Rom (1.1) corrected this fault. If a disassembled listing of the Tandy Rom is examined, there is no free space available in the 16K for extra routines.

Dragon Data on the other hand provides the full 16K Extended Colour Basic as standard. Because the entire interpreter is supplied, the coding can be more compact than the Tandy version (although there are still the 'hooks' in the same places), and it resides in the same area of the memory map as the Coco Rom (B000-BFFF).

## Unused space

But a disassembled listing shows an unused space from BFFF to BFFF in the Dragon Rom and the internal routines are not all the same. A prime example of this is the keyboard scan routine.

You may have noticed that when you are typing fast, the Dragon may fail to pick up some of the letters you have typed. This will occur if a key in the same row is pressed too quickly. For example, if you press the *h* key and then any other key in

the stage A-0 quickly, you will find the second key will be missed. If you repeat the process, but press any other key outside the range 0-0L, everything will be okay.

This problem with the keyboard scan routine on the Dragon shows up when you are working in Basic, and use the INKEY scan command. A good number of programs for the Coco use the combination of SHIFT/CLEAR key to return a value of 50 (50 in decimal, where the unshifted value is 5C). If you run the following short program, you will find that only by judicious operation of both keys simultaneously can you return this value of 5C.

```
10 XS=INKEY IF XS="" THEN 10
20 Y=ASC (XS/PRINT Y
30 GOTO 10
```

## Faster games

This problem does not occur with the Coco because the keyboard scan routine is different, and operates more slowly. A useful spin-off is that games which are converted to the Dragon operate much faster.

Programs written in Basic will sometimes work on both machines, but the following points must be kept in mind:

- 1) To load a Colour Tandy Basic program and vice versa, it must first have been saved in ASCII format (eg OSAVE "GAME".A).
- 2) Do not write long lines of codes (no longer than 200 characters a line if possible), because the ASCII save can in varying circumstances truncate the expanded line, and ends of lines will be lost.
- 3) Coco machine code routines will very rarely work on the Dragon, so stay clear of Coco USR calls.
- 4) When making USR calls on the Dragon, you can define up to 10 USR routine addresses (DEFUSR 0-9) but the Dragon Rom has a bug in it and you can only access USR0. This means that X=USR(0) will be interpreted as X=USR(5). To get around this problem, define each call as USR0 just before making it, for example:  
 10 DEFUSR0=MH00000-X=USR(0)  
 20 DEFUSR0=MH00000-X=USR(0)  
 3) Keep clear of combining USR call and DEFN. Strange errors can occur, and routines which work on the Coco will not necessarily work on the Dragon.  
 10 DEFNAA00=LN0USR0CH00  
 (121+70-8.0)  
 20 A=NA00

This example, when used with the correct machine code routine, will draw coloured border around the screen, but on the Dragon all you will get is an FC error.

- 5) Do not compact the coding of Basic programs by the removal of the blank spaces, as this can in certain circumstances generate errors. Both the Dragon and the Coco suffer from this problem, but it appears more prevalent on the Dragon. On other implementations of Microsoft Basic, removal of blank spaces does no harm, and programs are available to compact the code by this method, for example TRS80 level 2 Basic. ■



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- Play (adverbs) to the highest of order
- Play (adverbs) to the highest of order
- Play (adverbs) to the highest of order
- Play (adverbs) to the highest of order

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## Duck Shoot

From Tony Smith in Milton Keynes

THE OBJECT OF the game is quite simple: you have to shoot the ducks swimming on the pond. However, you have to do it by inputting the angle of elevation of the barrel, so that the bullet hits up and then falls on the unsuspecting duck.

All you have to do to fire is type in the barrel's angle of elevation. The computer does the rest by plotting the projectile's path.

As the gun used is double-barrelled, you

have two shots at each duck. The number of shots you have left, and the number of ducks hit, are shown as dots at the top of the screen. The letters are written by use of the Dragon's DRAW command, as is the main message. The ducks are positioned on a random basis, and use the GET and PUT commands, rather than retrace the duck each time.

The program makes use of the Dragon's high-resolution graphics, and uses the PLAY command for a selection of the Death March, every time a duck is hit.

### Program notes

Lines 152-410 Set up the picture, and input the angle, from which the pa-

rabola of the trajectory is chosen.

420-450 Draw the main message.

470-500 Tell you if you've shot yourself, or run out of ammunition.

570-610 PUT the ducks at a random position on the pond.

620-660 Deal with the end of the duck if it is hit.

680-750 Ask the file sequence.

760-800 Print the instructions.

8100-8140 Plot the square of ducks hit, and the number of shots left.

8000-8070 DRAW the score words.

8500-8670 GET the duck shape and check the first duck.

The program takes up approximately 8K of the Dragon's memory.

```

10 REM*****Duck Shoot*****
20 REM***** 0.4.83 *****
30 REM*****Dragon User*****
40 CLEAR 100
50 REM*****
60 REM*****
70 REM*****
80 REM*****
90 GETO 000
100 PRINT "0.4.83 Duck Shoot"
110 PRINT "By Tony Smith"
120 PRINT "Milton Keynes, Bucks"
130 PRINT "Milton Keynes, Bucks"
140 PRINT "Milton Keynes, Bucks"
150 PRINT "Milton Keynes, Bucks"
160 PRINT "Milton Keynes, Bucks"
170 PRINT "Milton Keynes, Bucks"
180 PRINT "Milton Keynes, Bucks"
190 PRINT "Milton Keynes, Bucks"
200 PRINT "Milton Keynes, Bucks"
210 PRINT "Milton Keynes, Bucks"
220 PRINT "Milton Keynes, Bucks"
230 PRINT "Milton Keynes, Bucks"
240 PRINT "Milton Keynes, Bucks"
250 PRINT "Milton Keynes, Bucks"
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280 PRINT "Milton Keynes, Bucks"
290 PRINT "Milton Keynes, Bucks"
300 PRINT "Milton Keynes, Bucks"
310 PRINT "Milton Keynes, Bucks"
320 PRINT "Milton Keynes, Bucks"
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710 PRINT "Milton Keynes, Bucks"
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730 PRINT "Milton Keynes, Bucks"
740 PRINT "Milton Keynes, Bucks"
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760 PRINT "Milton Keynes, Bucks"
770 PRINT "Milton Keynes, Bucks"
780 PRINT "Milton Keynes, Bucks"
790 PRINT "Milton Keynes, Bucks"
800 PRINT "Milton Keynes, Bucks"
810 PRINT "Milton Keynes, Bucks"
820 PRINT "Milton Keynes, Bucks"
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840 PRINT "Milton Keynes, Bucks"
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870 PRINT "Milton Keynes, Bucks"
880 PRINT "Milton Keynes, Bucks"
890 PRINT "Milton Keynes, Bucks"
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940 PRINT "Milton Keynes, Bucks"
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960 PRINT "Milton Keynes, Bucks"
970 PRINT "Milton Keynes, Bucks"
980 PRINT "Milton Keynes, Bucks"
990 PRINT "Milton Keynes, Bucks"

```

```

1000 PRINT "0.4.83 Duck Shoot"
1010 PRINT "By Tony Smith"
1020 PRINT "Milton Keynes, Bucks"
1030 PRINT "Milton Keynes, Bucks"
1040 PRINT "Milton Keynes, Bucks"
1050 PRINT "Milton Keynes, Bucks"
1060 PRINT "Milton Keynes, Bucks"
1070 PRINT "Milton Keynes, Bucks"
1080 PRINT "Milton Keynes, Bucks"
1090 PRINT "Milton Keynes, Bucks"
1100 PRINT "Milton Keynes, Bucks"
1110 PRINT "Milton Keynes, Bucks"
1120 PRINT "Milton Keynes, Bucks"
1130 PRINT "Milton Keynes, Bucks"
1140 PRINT "Milton Keynes, Bucks"
1150 PRINT "Milton Keynes, Bucks"
1160 PRINT "Milton Keynes, Bucks"
1170 PRINT "Milton Keynes, Bucks"
1180 PRINT "Milton Keynes, Bucks"
1190 PRINT "Milton Keynes, Bucks"
1200 PRINT "Milton Keynes, Bucks"
1210 PRINT "Milton Keynes, Bucks"
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1260 PRINT "Milton Keynes, Bucks"
1270 PRINT "Milton Keynes, Bucks"
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1600 PRINT "Milton Keynes, Bucks"
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1660 PRINT "Milton Keynes, Bucks"
1670 PRINT "Milton Keynes, Bucks"
1680 PRINT "Milton Keynes, Bucks"
1690 PRINT "Milton Keynes, Bucks"
1700 PRINT "Milton Keynes, Bucks"
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1770 PRINT "Milton Keynes, Bucks"
1780 PRINT "Milton Keynes, Bucks"
1790 PRINT "Milton Keynes, Bucks"
1800 PRINT "Milton Keynes, Bucks"
1810 PRINT "Milton Keynes, Bucks"
1820 PRINT "Milton Keynes, Bucks"
1830 PRINT "Milton Keynes, Bucks"
1840 PRINT "Milton Keynes, Bucks"
1850 PRINT "Milton Keynes, Bucks"
1860 PRINT "Milton Keynes, Bucks"
1870 PRINT "Milton Keynes, Bucks"
1880 PRINT "Milton Keynes, Bucks"
1890 PRINT "Milton Keynes, Bucks"
1900 PRINT "Milton Keynes, Bucks"
1910 PRINT "Milton Keynes, Bucks"
1920 PRINT "Milton Keynes, Bucks"
1930 PRINT "Milton Keynes, Bucks"
1940 PRINT "Milton Keynes, Bucks"
1950 PRINT "Milton Keynes, Bucks"
1960 PRINT "Milton Keynes, Bucks"
1970 PRINT "Milton Keynes, Bucks"
1980 PRINT "Milton Keynes, Bucks"
1990 PRINT "Milton Keynes, Bucks"

```



# Quik

From J. Hilton of St Agnes

From J. Berford of Manley Hall Farm

THIS PROGRAM is designed to load the Dragon 32 direct from the hex dump without having to convert the hex dump into decimal first. It can put values into any available memory space by changing the values of A.

The amount of data must equal the number of memory locations accessed. After inserting all data correctly program can be run. When DR prompt appears, delete all this program. Then access machine code program as normal.

## Program notes

- Lines
- 15 - Sets up memory accessed. Reads hex value.
  - 25 - Splits hex into powers (L = 16<sup>2</sup> and R = 16<sup>1</sup>). Returns the ASCII code.
  - 55-5-40 - Checks if L and R - A is F and adjusts accordingly.
  - 55 - Converts to decimal.
  - 65 - Pokes memory location with decimal value.
  - 75 - Repeats for next memory location.
  - 85 - Start of data statements.

LINE 20 SETS all the colours available in the low resolution mode in a random order on the 81 x 32 grid. As the colours build up it is gradually transformed into the 95 x 32 grid. Run it for a while.

1 REM COLOURFUL QUIK  
10 CLSC  
20 SETPOS(0,0) : PSET(0,0)  
30 GOTO 20

# Machine code loading

```
10 FOR A = 1540 TO 1549 : READ BS
20 L = ASC(LEFT$(BS,1)) : R = ASC(RIGHT$(BS,1))
30 IF L = 65 OR L = 66 OR L = 67 OR L = 68 OR L =
  69 OR L = 70 THEN L = L - 55 ELSE L = L - 48
40 IF R = 65 OR R = 66 OR R = 67 OR R = 68 OR R =
  69 OR R = 70 THEN R = R - 55 ELSE R = R
  - 48
50 T = L * 16 + R
60 POKE A,T
70 NEXT
80 DATA FF,EE,DD,01,BE,67,0B,
  C0,9A,3B
```

# Brainbox

From Paul Meade in Poole

BRAINBOX is the familiar logic game which has taken many forms over the centuries. You are required to guess the exact pattern of concealed colours. In fact, this version for the Dragon 32 selects any five colours from eight, in order, and gives you 12 guesses in which to discover that hidden pattern. Any colour may be repeated as many times as the processor/random number generator decides.

The colours used are the eight natural colours of the Dragon and, consequently, a black background is necessary.

Unlike many computers which have keys already marked with colour names, the Dragon is lacking, I have typed a small piece of card above the 1 to 8 keys on my machine, carrying coloured squares as follows:

- |                 |                     |
|-----------------|---------------------|
| 1 = green       | 5 = light blue      |
| 2 = yellow      | 6 = cyan/light blue |
| 3 = blue (dark) | 7 = magenta/maroon  |
| 4 = red         | 8 = orange          |

This facility can obviously then be used in other programs. It is actually an improvement on other machines which show only the colour names and not the colours.

To play the game, the player presses five colour keys resulting in five coloured squares appearing in a vertical line on the screen. When all five have been selected, the program responds with an assessment of the guess.

At the foot of the screen, for each colour

guessed correctly in its right position, a black square appears. For each other colour guessed correctly but in the wrong position, a white square appears. After several guesses, if the player receives five white squares, he knows he has the correct colours but that some are in the wrong positions.

After 12 unsuccessful attempts, the program displays the hidden pattern. This pattern can be displayed at any time should the player wish to concede, simply by pressing the 1 key. This key was used since it requires the shift key also to be depressed and is therefore unlikely to be touched accidentally.

## Arrays

- G Colour codes of the guess.
- H Colour codes of the hidden line.
- I Indicators showing which positions have been counted for black squares, in which colours are guessed in the correct positions.
- W Indicators showing which positions have been counted for white squares, in which colours are correctly guessed but in a different position from that in the hidden line.

## Variables

- AS Multipurpose in setting up the screen and accepting guesses from the keyboard.
- BS Blank used for masking parts of the screen display.
- C Number of colours from which to select (eight).
- J Loop count (one to five)
- K Loop count (one to five)

- M Number of attempts before the solution is revealed (one to 12).
- P Position on screen for the next black/white assessment square.
- R Number of colours in one line guessed in their correct position.
- S Number of colours selected (five).

To reduce the difficulty of the problem, the colours could be reduced to say six and the number selected to four by altering lines 535, 760 and 810 — clearly the instructions would need to be changed also if this was permanent (1 to 8 and 1 to 6).

## Lines

- 300 Preliminaries and instructions. Setting up the screen.
- 500 Set number of colours and selections.
- 570-580 Computer chooses random line.
- 600 The 12 attempts.
- 610-630 Reset indicators for the next guess.
- 640 Set screen position for next assessment square.
- 650-710 Accept colour selection, checking for a correct line and marking those colours in their correct positions.
- 715 Print the appropriate number of black squares.
- 720-830 Count the number of colours not already marked which are correct but not in their right positions — while for each.
- 850-940 End position or if conceding — display hidden line.
- 955-999 Invite further games.
- 1000-and Delay subroutine.

Program listed on page 42



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**FOR THE**  
**DRAGON 32**



11 **FRANCESCO J. L. RIVERA** | **FRANCESCO**

**Figure 1**

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11 12

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11/11/2011 11:11:11 AM

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**DRAGON 32  
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**DRAGON 32  
USERS CLUB**  
31 North Street  
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Dorset BH20 1A

[illegible]



```

10 ' *** BRAINSON ***
20 ' *** BY ***
30 ' *** P.VERDOLLE ***
40 ' *** POOLE ***
50 ' *** C.C. ***
60 ' *****
70 DIM R(10),M(10),N(10),O(6)
80 CLS 2
90 PRINT #76,"BRAINSON";
100 PRINT # 128,"YOU HAVE TO GUESS THE HIDDEN"
110 PRINT "PATTERN OF 5 COLOURS CHOSEN FROM 0"
120 PRINT # 256,"YOU HAVE 12 TRIES TO GUESS THE CORRECT ARRANGEMENT"
130 PRINT # 352,"ANY COLOUR MAY BE REPEATED ANY NUMBER OF TIMES"
140 DOSUB 1000
150 CLS 0
160 PRINT # 32,"THE COLOURS YOU MAY CHOSE ARE "
170 FOR C=1TO5
180 : PRINT # 64+C*32,CHR$(127+16*C);
190 : PRINT # 68+C*32,C;
200 NEXT C
210 PRINT # 352, "THE NUMBERS REPRESENT THE KEYS"
220 PRINT "YOU MUST PRESS TO CHOOSE THAT COLOUR"
230 DOSUB 1000
240 CLS 7
250 PRINT # 64,"AT THE FOOT OF THE SCREEN, YOU"
260 PRINT "WILL BE GIVEN AN ASSESSMENT OF"
270 PRINT "HOW GOOD IS YOUR GUESS TO THE HIDDEN LINE"
280 PRINT # 224,CHR$(120);" MEANS A COLOUR IS IN THE RIGHT PLACE"
290 PRINT # 320,CHR$(207);" MEANS A CORRECT COLOUR HAS"
300 PRINT " BEEN CHOSEN BUT IT IS IN THE WRONG POSITION"
310 DOSUB 1000
315 AB="";CLS 0
320 '
330 ' *** SET UP THE SCREEN ***
340 '
350 FOR R=0 TO 20
360 : AB=AB+CHR$(131);
370 NEXT R
380 PRINT # 224,AB;SB="
390 FOR L=0 TO 4
400 : PRINT # L*64,CHR$(65+L)+CHR$(120)+CHR$(120);
410 : PRINT # L*64+34,CHR$(120);
420 : PRINT # L*64+36,CHR$(120);
430 : PRINT # L*64+50,CHR$(120);
440 : IF L<4 THEN PRINT # 224+L*32,SB; ELSE PRINT # 482,LEFT$(SB,25);
450 NEXT L
460 PRINT # 256 ,CHR$(120);;PRINT # 314,CHR$(135);
460 PRINT # 50, "BRAIN";
470 PRINT # 124,"BOX";
480 PRINT # 155,LEFT$(AB,5);
490 PRINT # 379,"PRESS";
500 PRINT # 413,"?";
510 PRINT # 444,"TO";
520 PRINT # 475,"STOP";
530 C=0;S=0;B="";
540 '
550 ' *** START ***
560 '
570 FOR R=1 TO 5
580 : H(R)=RND(C);IB=SB+CHR$(120)
590 NEXT R
600 FOR M=1 TO 10
610 : FOR O=1 TO 5
620 : R(O)=0;M(O)=0

```

Continued on page 44







```

630 : NEXT K
640 : P=300+M*2:R=0
650 : FOR K=1 TO 5
660 :   RE=INKEY$:IF RE="" THEN 650
670 :   IF RE="?" THEN R=12:GOTO 660
680 :   IF RE<"1" OR RE>CHR$(C) THEN 650
690 :   C(K)=ASC(AR)-40
700 :   PRINT @ 3064-63+M*2,CHR$(127+16*G(K))
710 :   IF C(K)=M(K) THEN R=R+1:R(K)=1 ELSE R(K)=0
720 :   IF R=5 THEN PRINT @ 347, "HELL ";:PRINT @ 379, "DONE ";:GOTO 660
710 : NEXT K
715 : IF R=0 THEN PRINT @ P,CHR$(120);:P=P+32:R=R-1:GOTO 715
720 : FOR K=1 TO 5
730 :   IF R(K)=1 THEN 630
740 :   FOR J=1 TO 5
750 :     IF J=K THEN 620
760 :     IF R(J)=1 THEN 620
770 :     IF G(K)=C(K) THEN 620
780 :     IF H(J)=1 THEN 620
790 :     H(J)=1
800 :     PRINT @ P,CHR$(267);:P=P+32
810 :     J=5
820 :   NEXT J
830 : NEXT K
840 : R=0
850 NEXT M
860 IF RE<"?" THEN 810
870 PRINT @ 347, "HARD ";
880 PRINT @ 379, "LUCK ";
890 FOR K=0 TO 2
900 : PRINT @ K*32+411, " ";
910 NEXT K
920 : FOR K=1 TO 5
930 : PRINT @ 644K-37,LEFT$(B4,2)+CHR$(R(K)*16+127)+LEFT$(B4,2);
940 : PRINT @ 644K-5,88;
950 NEXT K
960 PRINT @ 411, "PLAY "A
970 PRINT @ 443, "AGAIN";
980 PRINT @ 475, "Y/N ?";
990 RE=INKEY$:IF RE="" THEN 960
995 IF RE="Y" THEN CLS @:GOTO 315
995 CLS 7:PRINT @ 224, "      THANKS FOR PLAYING":END
999 "
1000 " *** WAIT ***
1010 "
1020 PRINT @ 450, "PRESS DEL 800 TO CONTINUE";
1030 RE=INKEY$:IF RE<" " THEN 1030
1040 RETURN

```

## Machine clock

From Jan Nicholson on Merseyside  
**HOW MANY TIMES** have you glanced at your watch after staring at a flashing cursor for hours on end, only to find that you have missed your favourite programme? Well now you can change all that with this program for a real time. You get a permanent on-screen display in hours,

minutes and seconds, which will keep running while any Basic program is running.

The program, written completely in machine code, must be entered from locations 512 to 508. The listing is given in hex to help you follow the program if you know anything about machine code. You can enter it directly into your Dragon with a hex monitor, or by using the following short program.

```

10: FOR I=512 TO 508
20: PRINT I:
30: INPUT P: FOR L=1 P
40: NEXT

```

You must not forget to precede each number with "chr" to let the computer

know you are dealing with hex numbers. Enter the numbers carefully — any mistake will have disastrous effects.

As it stands the program will still not run, as the control system does not pass through it. You must alter the jump address at 0100. Since the Basic interpreter passes through the address, any attempt to change it using "POKE" will crash the system.

Fortunately a short machine code routine will do the job:

```

15000 GC
15001 02
15002 08
15003 FD

```



15804 B1  
15805 B2  
15806 B3

Having entered this in a similar manner

to the main program type in the following:  
EXEC 15809 CRAWCOM " TIME IN "  
355,555,343

Your clock should appear and start run-

ning. If you load the program from tape using CLOAD it will run immediately on loading without typing in any additional commands.

522	86	523	97	524	84	545	5C	546	86	567	F7	578	78	588	48
523	82	524	88	525	A6	546	C1	567	82	588	4F	579	78	589	00
524	1F	525	9F	526	84	547	05	568	4A	589	1F	580	7A	591	44
525	88	526	8C	527	A1	548	26	569	A8	570	88	581	A2	582	00
526	88	527	82	528	A0	549	2F	568	81	571	78	582	7A	583	41
527	41	528	3C	529	26	550	0C	561	A7	572	8C	583	78	584	00
528	13	529	10	548	08	551	43	562	47	573	3D	584	7A	585	42
529	81	530	8C	541	08	552	8E	563	8C	574	70	585	78	586	82
530	00	531	42	542	78	553	84	564	84	575	70	586	82	587	44
531	27	532	45	543	A7	554	1E	565	17	576	70	587	3F	588	82
532	1D	533	4C	544	88	555	10	566	26	577	70	588	82	589	43

## Millipede

From Keith Hunniford in Action in Northern Ireland

MILLIPEDE IS A fast graphics game in which you are a millipede and to get home you have to cross a flowerbed, scattered with deadly slug pellets. Left and right arrow keys are used for movement and the

scoring is based on how many slugs you take. Your score is displayed at the end of the game and every 100 points gained the slug pellets become closer together.

### Program notes

Lines 10-30 Credits.  
40-140 Instructions.  
150 Sets up variables.  
170 Prints millipede (role inverse  
70).

180 Increases score.  
180-200 Calculates distance between pellets.  
220 Checks to see if millipede bumps into pellet.  
230-240 Auto repeat keyboard scan.  
250-260 Keep millipede on screen.  
260-300 Change slug pellet positions and keep slug pellets on screen.  
310-350 Score, etc.

## MILLIPEDE

```

10 '-----
20 'BY KEITH HUNNIFORD
30 '-----
40 CLS
50 PRINT$(5);"YOU ARE A MILLIPEDE"
60 PRINT$(5);"YOU HAVE TO CROSS "
70 PRINT $(5);"THE ROSE BED"
80 PRINT
90 PRINT"beaware of the. "
100 PRINT
110 PRINT$(10);"slugs pellets???"
120 PRINT$(10);"<-MOVEMENT->"
130 FOR N=1 TO 3:PLAY"TI0G0FFEE";NEXT N
140 CLS 1
150 A=18:P=499:B=1
160 PLAY"TZL20TZ5G05C"
170 PRINT$(256);"-u-";
180 B=B+1
190 D=ABS(18-(B/100))
200 IF D<5 THEN D=5
210 PRINT$(CHR$(159));PRINT$(D,CHR$(159));PRINT$(511;" ");
220 IF PEEK(1824+257+A)=159 THEN GOTO320
230 IF PEEK(343)=223 THEN A=A+1
240 IF PEEK(344)=223 THEN B=B+1
250 IF A<8 THEN A=8
260 IF A<25 THEN A=25
270 P=RN$(2)
280 IF P=1 THEN P=P-1 ELSE P=P+1
290 IF P<482 THEN P=482
300 IF P+D>518 THEN P=500
310 GOTO160
320 PRINT"YOU ATE a slug pellet"
330 PRINT"you are dead"
340 PRINT" YOU GOT "JB" STEPS
350 PLAY"TZL20TI0G0FFEE";GOTO140

```

ACROSS THE FLOWER BED"











Let's face it — the sound from your Dragon 32 wouldn't win any prizes at an Eisteddfod. What you need is a:-

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DRAGON 32

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## Errors Identified

WHILE I was attempting to convert and key in a Sharp program into my Dragon 32, I accidentally came across a new Dragon error code. This new error code, which was displayed on my screen, was UP error.

When seeing this unfamiliar error code I immediately attempted to look it up in my manual. But after discovering it was not there, I decided that you might be able to help. Can you?

Andrew Pidgeon  
Aurumill  
Surrey

THE UP error you have encountered is an Undefined Function error. This occurs when you call up a function that does not exist. For example, if you have a line A - F90 (variable) and have not already defined the function in a GDF F90 statement you will get this error.

The other error code which is not covered in the manual is a DB error, this being a Device Number error, which will occur if you call up a device which is not linked up. For example, POINT A - 3 will give you a DB error as no such device exists on your Dragon at present.

## Dragon Club opens

I HAVE a Dragon 32 which I purchased in February this year. As part of the package enclosed with the computer was the guarantee. On the bottom edge of this card were the words: "Every purchaser of a Dragon 32 computer will be made a free member for 12 months of the Dragon Club."

Since I sent off the guarantee some four weeks ago I've heard nothing. My question is: "Is this another of those 'get your money and forget the purchaser' deals we hear about so much?"

J. Jones  
Wigan  
Lancs

THIS IS not another of those "get your money" deals and you should have now received your first issue of the *Dragon User* newsletter from Dragon Data. There were, unfortunately, delays with the first issue.



Users who returned their warranty card before the date of release of *Dragon Press* will still have one year's free subscription, starting from the first issue of *Dragon Press* rather than the date of the warranty card. Users who have not yet received *Dragon Press* should contact Dragon Data with details and proof of purchase and they should then be put on the mailing list.

## Machine coding

I WOULD like to know if there are any machine code books for the Dragon 32, which would be suited to an absolute beginner. I am sure many other Dragon users would like to have this information.

A. W. Patel  
Bromley  
Middlesex

THERE ARE very few books on machine code for absolute beginners. A good general book is *Programming the 8085 by Zaks and Lakshmi*, published by Sybex, priced £12.95. This should be available from good bookshops and computer dealers.

For anyone contemplating learning machine code it is advisable to have an *Editor Assembler* such as that provided on cassette by Dragon Data. If you have problems learning

machine code I suggest you contact your nearest computer club where members may be able to advise you.

## Joystick wiring

I HAVE heard that it is possible to use Atari and several other joysticks with the Dragon simply by changing the plug. Could you give any advice about this and if possible publish a wiring diagram for the Dragon 32 plug?

J. C. McDuckin  
Widley  
Herts

SHOULD YOU NOT wish to use Dragon joysticks then you may connect other joysticks using a 5 pin DIN plug. The Dragon joystick contains two 100K potentiometers and joysticks of a similar type should be compatible. The connections are as shown in the diagram.

## Interfaces sought

I WOULD be very grateful if you could give me any information and addresses of where I could get a Dragon interface for controlling other objects using a program, for example for switching lights on and off or controlling

a robot. Also, I would like to know if anybody manufactures modules for the Dragon.

G. Page  
Teddington  
Essex

I AM not aware of any company that makes the type of interface you require, or a module for connecting through to other Dragons.

It should be possible to make your own interface for controlling lights via the printer port. Dragon Data is unable to supply details of the interface circuitry required but can supply the circuit diagram of the Dragon's I/O ports on application.

Should you require a module for connecting to Prestel, etc, then Moment 800 will be providing an acoustic coupler as part of its system.

## Inhibiting Break key

THE BREAK key on the Dragon is placed very near the horizontal cursor keys and cursor-controlled games often fail because the Break key is touched in error. I have tried taping for the Break key with INDEXYS but it is not fast enough.

Can I POKE somewhere to inhibit the Break key?

Tony D Brian  
Woodford Green  
Essex

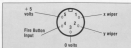
IT IS possible to disable the Break key with INDEXYS strings but if you use an input statement such as INPUT AS that will not be disabled. To get up the disable Break you should use the following POKEs strictly in the order given:

POKE 411,226  
POKE 412,260  
POKE 413,4  
POKE 414,237  
POKE 415,226

Then to disable the Break key use: POKE 416,226, or to then enable Break key use: POKE 416,57.

## Right Rainbow

THE CORRECT address for Ekan Electronics, which distributes *The Rainbow*, is 11 Dury New Road, Prestwich, Manchester M25 6LT. Tel: (061) 758 7813.



Front view of the socket on the Dragon



## Competition Corner

Send your answers to Competition Corner, Dragon User, Hobbhouse Court, London WC2 7HF

# Digging down to the roots

Gordon Lee tests your skills — Premier provides the prizes.

ASK A FRIEND to write down any large number — one with, say, eight or more digits. Now tell him to mix up the same digits to form a second number, and get him to subtract the smaller number from the larger.

For example: 72194819  
14367210

57827709

Now, tell him to cross out any single digit of the answer, except for any zero, and read out to you the remaining digits. So, in

the above example, if he crossed out one of the sevens he would read out 'Five, seven, zero, seven, seven, zero and three'. You then instantly tell him the missing digit.

Here's how you do it! As he reads out the digits you mentally add them up. So in this case you would add:

$$5 + 7 + 0 + 7 + 0 + 3 = 22$$

As this total is in itself more than one digit, then continue to add together the digits until only a single digit remains. So:

$$2 + 2 = 4 \quad 4 + 1 = 5$$

This is your key digit and to find out the

missing number that your friend crossed out simply subtract this key digit from 9. Amazing!

In fact, this trick relies on a very important principle in the field of mathematical puzzles — that of digital roots. The digital root — or DR — of a number is found by repeatedly adding the digits of that number until a single digit remains. Probably the most well known use of the DR is in determining if a large number is exactly divisible by either 3 or 9. Only numbers whose digital root is exactly divisible by 3 are themselves divisible by 3, and similarly, only numbers whose digital root is 9 are exactly divisible by 9.

For example, take the number:

17348672014112079

This has a digital root of 8, so we know that this number is not a multiple of either 3 or 9. We also know that if we were to divide the number above by 9 we would have a remainder of 8, and, similarly, if divided by 3 we'd give us a remainder of 2 ( $8 - 3 = 5$  plus 2 remainder).

Similarly all perfect squares have digital roots of either 1, 4, 7 or 9; all triangular numbers have digital roots of 1, 3, 6 or 9; and perfect numbers (with the exception of 6 — the lowest) are believed to have a digital root of 1. So we can say, without working it out, that the above number is neither 'square', 'triangular' nor 'perfect'.

Note though that a digital root will not prove that a certain number does fall into one of these categories, only as in the cases above, that it does not.

### No jokers

The principle can be transferred, for example I have in front of me an ordinary pack of playing cards from which I have removed the jokers, picture cards and tens. So I have left 36 cards, the 36 is nine of each of the four suits — hearts, clubs, diamonds and spades. I also have handy a number of plastic counters.

I have shuffled the cards and have dealt out four of them face upwards on to the table. These are a spade, a diamond and two hearts. I then multiply together the values of the cards (ace equals 1), and note the product obtained. This counts as one operation and so I put down one counter.

If the product so obtained consists of more than one digit, then I repeat the procedure with this number until only a single digit (or zero) remains. This is rather like finding the digital root except that here we are multiplying rather than adding the digits.

As an example, if my cards were A, 4, 4 and 9 I would write:

$$1 \times 4 \times 4 \times 9 = 144 = 1 \times 4 \times 4 = 16 = 1 \times 6 = 6$$

This has taken three operations, so I would also have three counters on the table.

However, with the cards that I have dealt, I find that I end up with six counters. If the lowest card is the spade — what cards are on the table?

### Prizes

THE PRIZE THIS month is the new Delta 1 disk operating system, donated by its developer Premier Microsystems. The package consists of a controller cartridge and 40-track, single-sided Canon disk drive, along with interconnecting cable and manual. The system provides 120K of storage.

### Rules

TO WIN this disk operating system, you have to send in the most elegant solution to the puzzle. You must show how the competition can be solved with the use of a BASIC program, developed on your

Dragon 32 computer.

As a tie-breaker, complete the following sentence in 15 words or less:

I want to add a disk operating system to my Dragon in order to...

Your entry must arrive at Dragon User by the last working day in June 1983. The name of the winner, and the solution to the puzzle, will be printed in the August issue of Dragon User. You may only enter the competition once. Entries will not be acknowledged and we cannot enter into correspondence on the result.

Please send your entries to Competition Corner, Dragon User, Hobbhouse Court, London WC2 7HF.





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# TELEWRITER™

## the DRAGON 32 Word Processor

### TELEWRITER

Telewriter is the powerful word processor designed specifically for the DRAGON 32 computer. It can handle almost any serious writing job and is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, formatted copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

### 51 x 24 DISPLAY

The DRAGON 32 is an incredibly powerful and versatile computer, but for one thing it has some major drawbacks. The small 32 character by 24 line screen format shows you too little of the text and, combined with its lack of lower case letters, leaves little room to breathe in the way text really looks on the page. Elsewhere in place of lower case just adds confusion.

Telewriter eliminates these drawbacks with no hardware modifications required. By using software alone, Telewriter creates a new character set that has **lower case letters**, a 2 plus 24 lines of 31 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the DRAGON 32's standard display.

### FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are simple key or single key plus control keys, fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, and beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the wordwrap feature moves you cleanly to the next.

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a full

The only one with all these features for your DRAGON 32

**51 columns x 24 line screen display**

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**Special MSX-80 driver**

**Requires absolutely**

**no hardware modifications**

**+ Tandy colour version**

**also available**

key, tells you how much space you have left in memory, and warns you when the buffer is full.

### FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify left, right, top, and bottom margins, line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in text.

Telewriter will automatically number 64 pages (if you want) and count lines. It can chain print any number of text files from cassette without user intervention. You can tell it to start a new page anywhere in the text or pause at the bottom of the page.

You can print all or any part of the text buffer, above the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because Telewriter lets you put your memory control codes directly either from the menu or during printing, it works with any printer (Tandy, Sokolov, MSX-80, Oricolor, NEC 8023, C. 1108 8218, Commodore, GEI, Tormicro, Smith Corona TP-1, etc.). There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single under line character.

### CASSETTE INPUT/OUTPUT

Because the Telewriter makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk. The advanced cassette handler will search in the forward direction till it finds the first valid file, so there's no need to keep retyping a load command when you are lost in your tape. The handy command checks your cassette drive to make sure they're good. You can save all or any part of the text buffer to cassette and you can append pre-existing files from those you have in the buffer already.

### ASCII COMPATIBLE

Telewriter runs your DRAGON 32 like the most powerful, lowest cost, word processor in the world today. But that's not all. The simple ASCII conversion program provided with Telewriter means you can use the full power of the Telewriter editor for creating and editing BASIC and assembly language programs. It means you can use Telewriter to prepare or edit text files and with any data communications program.

Telewriter costs £49.95 on cassette and is

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